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**BRYAN, ELLEN JANE**  
**THE EFFECTS OF SELECTED INSTRUCTIONAL AIDS**  
**AND DEVICES ON THE IMPROVEMENT OF FUNDAMENTAL**  
**VOLLEYBALL SKILLS.**

**MIDDLE TENNESSEE STATE UNIVERSITY, D.A., 1978**

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**THE EFFECTS OF SELECTED INSTRUCTIONAL AIDS  
AND DEVICES ON THE IMPROVEMENT OF  
FUNDAMENTAL VOLLEYBALL SKILLS**

**Ellen Jane Bryan**

**A dissertation presented to the  
Graduate Faculty of Middle Tennessee State University  
in partial fulfillment of the requirements  
for the degree Doctor of Arts**

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THE EFFECTS OF SELECTED INSTRUCTIONAL AIDS  
AND DEVICES ON THE IMPROVEMENT OF  
FUNDAMENTAL VOLLEYBALL SKILLS

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## ABSTRACT

### THE EFFECTS OF SELECTED INSTRUCTIONAL AIDS AND DEVICES ON THE IMPROVEMENT OF FUNDAMENTAL VOLLEYBALL SKILLS

by Ellen Jane Bryan

This study was designed to determine the effects of three instructional approaches on the improvement of selected skills in beginning volleyball at the college level. The three instructional approaches utilized were: (1) traditional instruction consisting of explanation, demonstration, drills, and lead-up games; (2) traditional instruction supplemented with instructional aids in the form of loop films and video tapes; and (3) traditional instruction supplemented with instructional devices in the form of the Spike-It, harnessed balls, and volleyball goals.

The subjects were fifty-one male and female students enrolled in three volleyball service classes at Pembroke State University during the second half of the Fall Semester of the 1977-78 academic year. All three classes were coeducational and were taught by the investigator. These classes met for fifty minutes, twice a week, for six weeks.

The groups of subjects were predetermined by patterns of registration and were randomly assigned to one of three treatments: Group I received traditional instruction; Group II received traditional instruction supplemented with instructional devices; and Group III received traditional instruction supplemented with instructional aids. The subjects in Groups II and III were randomly assigned to subgroups. Each subgroup in Group II spent equal practice time on the instructional devices throughout the treatment period. Each subject in Group III was video taped twice during each class meeting and viewed a loop film twice as a member of a subgroup in addition to viewing the loop film as a member of the class at the beginning of each class meeting. Each member viewed the replay of his performance immediately following the taping of his subgroup.

Improvement in the performance of the fundamental volleyball skills was determined by pretest and posttest scores on four skills tests including: (1) the Cunningham and Garrison High Wall Volley Test, (2) the AAHPER Passing Test, (3) the AAHPER Set-Up Test, and (4) the Sandefur Spiking Test.

The .05 level was utilized to determine significance for the statistical analysis conducted in this study. Preliminary analysis for homogeneity among the three groups was performed through the use of a series of four one-way

analyses of variance (ANOVAs) comparing pretreatment scores on four skills tests for the three groups. Because a significant difference was revealed in passing ability, pretreatment and posttreatment passing skill scores for the three groups were plotted to determine whether the rate of improvement among the groups was equivalent. After equivalency was established, a one-way ANOVA for difference (posttest minus pretest) scores was conducted. Traditional one-way ANOVAs were conducted on the other skills because homogeneity was established in the preliminary analysis. The ANOVA on difference scores on the skill of passing revealed a significant difference among the three groups. Scheffé's test revealed that a significant difference existed between Groups II and III. Group III, the group using instructional aids, yielded significantly higher scores than Group II, the group using instructional devices. Skill improvement within the groups was determined by  $t$  tests. Significant skill improvement occurred within each group.

The overall findings indicated that no particular instructional approach (treatment) used in this study was more effective than another in teaching the fundamental skills of volleyball except in the skill of passing. Improvement in passing ability was greater when using loop films and video-taped performances of the subjects than when using volleyball goals when teaching the skill of passing.

but not significantly greater than when using the traditional instructional approach. Regardless of the instructional approach used in this study, significant improvement in the fundamental volleyball skills occurred in each of the three groups.

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## Chapter 1

### INTRODUCTION

The following words were written by Dr. Harry Scott and serve to emphasize the need to utilize more effective techniques of teaching volleyball:

Since its invention about the turn of the century, volleyball has developed into one of the most frequently played, and best loved games in the world. There is scarcely a school, college, club, or recreational organization in this or any other country where the game is not played as a part of a comprehensive program of physical education or recreation. Unfortunately, the quality of instruction in volleyball is not up to the standards set by the teachers of other school and college games and sports. Some of the responsibility for this situation lies with the teacher education institutions. Where only a modicum of game knowledge and skill is required of future volleyball teachers, the product in the field is likely to be inferior.<sup>1</sup>

Dr. Linus J. Dowell defines techniques of teaching as "devices employed by the teacher to better carry out the subject matter."<sup>2</sup> He tells the story about a man who took a sieve to transport some water. Naturally, the man did not succeed in reaching his objective. Before his objective

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<sup>1</sup>Betty Jane Trotter, Volleyball for Girls and Women (New York: The Ronald Press Company, 1965), p. v.

<sup>2</sup>Linus J. Dowell, Strategies for Teaching Physical Education (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1975), p. 17.

could be reached, the method of carrying the water had to be changed by lining the sieve with clay. To reach the objective of transporting the water faster, a handle was attached to the sieve lined with clay. Dr. Dowell makes the following analogies:

The water is the subject matter, the carrier is the teacher, the way it is carried (container) is the method, and the handle and clay used to make the method of carrying water more effective are the techniques.<sup>3</sup>

Many textbooks contain methods and techniques of teaching. Some of the methods and techniques have been validated through research, while others have not. Even with the abundance of literature concerned with methods and techniques, effective teaching is lacking on different levels and in various fields. Dr. Dowell states, "As fantastic as it may seem, a great many teachers 'carry water in a sieve.'"<sup>4</sup>

There is an old saying that you can lead a horse to water, but you can not make him drink; perhaps this saying can be applied to some teachers. Effective teaching methods and techniques may be developed, but a teacher can not be forced to use them. On the other hand, in this age of accountability, perhaps the horses will become thirsty and drink the water. This is not to say that teachers should be

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<sup>3</sup>Dowell, p. 17.

<sup>4</sup>Dowell, p. 17.

coerced into using certain methods or techniques of teaching to keep their jobs because to do so would be infringing upon their rights of academic freedom; but teachers should seek out those techniques and methods that will enable them to become more effective in guiding the learner.

Devices and aids have been utilized as techniques in teaching skills. These tools include slides, filmstrips, loop films, teaching machines, photographs, flash cards, and various mechanical aids including commercial and homemade devices such as the pitching machine, the Spike-It, targets, harnessed balls, spiking racks, tethered balls, flotation devices, and many more.

Too often, instructors employ certain instructional aids and devices with little or no knowledge of their proven effectiveness. Commercial products are advertised in professional journals and magazines or are recommended in textbooks with no validated information to support their effectiveness as techniques for achieving and improving the skills for which they were supposedly designed. For example, the Spike-It, an instructional device for teaching spiking skills in volleyball, is advertised in the Volleyball Magazine as follows: "The plain fact is that the Spike-It will enable your players to learn to spike faster and better than any other method."<sup>5</sup> Whether this statement

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<sup>5</sup>Volleyball Magazine, Number 3, Summer, 1976, p. 25.

is true remains to be seen. It is not very probable that this device has been measured against all the various devices and methods for teaching the spike that have existed in the past and exist today. A review of the literature did not reveal information pertaining to research on this particular device. Trotter,<sup>6</sup> Laveaga,<sup>7</sup> and Emery,<sup>8</sup> experts in the field of teaching volleyball, suggest the use of such devices as a harnessed ball, volleyball goals, spiking rack, and set-pass goal for the purpose of achieving and improving volleyball skills; however, a review of the literature revealed little or no research pertaining to these devices.

#### STATEMENT OF THE PROBLEM

This study was designed to compare three methods of instruction on the improvement of selected skills in beginning volleyball at the college level.

#### STATEMENT OF THE PURPOSE

The purpose of this study was to determine the effects of supplementing traditional instruction with instructional aids in the form of loop films and video tapes;

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<sup>6</sup>Trotter, p. 78.

<sup>7</sup>Robert E. Laveaga, Volleyball (New York: The Ronald Press Company, 1960), p. 30.

<sup>8</sup>Curtis Ray Emery, Modern Volleyball (New York: The Macmillan Company, 1953), pp. 19, 33.

traditional instruction supplemented with instructional devices in the form of the Spike-It, volleyball goals, and harnessed balls; and traditional instruction consisting of explanation, demonstration, drills and lead-up games on the improvement of the skills of spiking, passing, and setting. The rationale for selecting these skills was based on the opinion of experts that the bump pass, overhead set, and the spike are the three patterns of play in volleyball that will give the player the fundamental skills required to play the game.<sup>9</sup>

#### JUSTIFICATION OF THE STUDY

For years, instructional aids and devices have been used in the instruction of sports skills, but related studies revealed very little information regarding the use and effectiveness of such techniques. Studies regarding visual aids, particularly video tape, are numerous; on the other hand, studies regarding the use of mechanical devices are very limited. Related studies pertaining to both of these areas showed a variety of findings. This study sought to determine the effects of traditional instruction, traditional instruction supplemented with selected instructional devices, and traditional instruction

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<sup>9</sup>Kathleen Gregory and Bobbi Parrish, "Fundamental Volleyball," Coaches Digest (Branford, Connecticut: Publishing, Inc., 126 Pawson Road, 1976), p. 52.

supplemented with instructional aids on the improvement of fundamental volleyball skills.

#### SIGNIFICANCE OF THE STUDY

Everyone concerned with the teaching of sports-related skills should be concerned with utilizing the most effective tools available as techniques to supplement the methodologies of teaching employed. Just as there is no one best method of teaching, there is no one best technique; however, physical educators, recreators, coaches, and anyone else involved in teaching sports skills should constantly seek out the best methods and instructional aids and devices in an attempt to become more effective in their teaching endeavors.

This study contributes to present knowledge concerning the effectiveness of instructional aids and devices utilized in the instruction of fundamental volleyball skills. Through the analysis of information collected in this study, the bases upon which teachers and coaches of volleyball select, construct, or purchase certain instructional aids and devices may be improved.

#### DELIMITATIONS OF THE STUDY

The delimitations of this study were:

1. The subjects were fifty-one (51) men and women enrolled in three physical education service classes

in volleyball during the Fall Semester of the 1977-78 academic year at Pembroke State University.

2. All three classes received the same instructions and were taught by the investigator.

3. The subjects were requested not to practice volleyball outside of class time.

4. The primary emphasis in all classes was on the improvement of ability to execute three fundamental volleyball skills or patterns of play with accuracy and consistency.

5. The skill test used to determine the initial homogeneity and improvement in general volleyball playing ability was the Cunningham and Garrison High Wall Volley Test.<sup>10</sup>

6. The Sandefur Spiking Test was used to measure improvement in spiking ability.<sup>11</sup>

7. Improvement in passing and setting ability was measured by the AAHPER Volleyball Passing Test and Set-Up Test.<sup>12</sup>

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<sup>10</sup>Phyllis Cunningham and Joan Garrison, "High Wall Volley Test for Women's Volleyball," Research Quarterly, 39:486-490.

<sup>11</sup>Randy Sandefur, Volleyball (Pacific Palisades, California: Goodyear Publishing Company, Inc., 1970), p. 72.

<sup>12</sup>Mary Jane Haskins, Evaluation in Physical Education (Dubuque, Iowa: Wm. C. Brown Company, 1971), pp. 168-172.

8. All classes were conducted in the Auxiliary Gymnasium in the Health and Physical Education Center.

9. All testing was done under the same conditions for all subjects and all classes.

#### LIMITATIONS OF THE STUDY

Certain variables might have existed that could have affected this study. These variables were as follow:

1. The motivational levels of the subjects might not have been the same.

2. The amount of carry-over learning gained from previous experiences might have had an effect on the criterion skills.

3. The groups of subjects used in this study were predetermined by patterns of registration; therefore, compensation for natural discrepancies among groups could not be made.

4. The groups consisted of no more than twenty (20) subjects each.

#### DEFINITIONS OF TERMS

Traditional Instruction. For the purpose of this study, this term is defined as that method of instruction consisting of explanation, demonstration, drills, and lead-up games.

Fundamental Volleyball Skills. This term refers to:

1. Passing--the act of moving the ball between teammates from the back court to the setting zone; usually executed with a forearm bump pass, but sometimes with an overhead pass.

2. Setting--the act of passing the ball into the air near the net to enable a teammate to spike the ball; usually involves the overhead pass, but the forearm bump pass may be utilized.

3. Spiking--the act of hitting the ball downward, with force, into the opponent's court.

Instructional Devices. Any implement, machine, or other device used in skill instruction to limit the scope of the learner's response, to provide feedback, or to increase the number of attempts the learner has per unit of time.<sup>13</sup>

Instructional Aids. Any machine, implement, or other device that gives visual guidance, aids in clarification of verbal material, or presents material in some manner other than a teacher lecture.<sup>14</sup>

Volleyball Goal. An instructional device consisting of a three-dimensional wooden frame for the purpose of

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<sup>13</sup>Daryl Siedentop, Developing Teaching Skills in Physical Education (Boston: Houghton Mifflin Company, 1976), pp. 169-170.

<sup>14</sup>Siedentop, pp. 169-170.

providing a goal for passing and setting a volleyball.<sup>15</sup>  
See Appendix A.

Spike-It. A commercial instructional device constructed of tubular metal and Styrofoam which can be telescoped for the purpose of holding a volleyball at various heights providing the player with a stationary volleyball to spike.<sup>16</sup> See Appendix B.

Harnessed Ball. An instructional device consisting of a volleyball temporarily suspended by a rope or string and attached to a wooden dowel or other type of support.<sup>17</sup> The device may be used to teach the overhead serve or spike. See Appendix C.

## HYPOTHESES

The following null hypotheses were tested:

H<sub>1</sub>: There will be no differences in general volleyball ability among the three groups based on the initial test data.

H<sub>2</sub>: There will be no differences among the experimental treatments for increasing mean skill performance of general volleyball ability.

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<sup>15</sup>Laveaga, p. 30.

<sup>16</sup>Volleyball Magazine, p. 25.

<sup>17</sup>Trotter, p. 78; see, also, James A. Baley, "Teaching the Spike in Volleyball," Journal of Health, Physical Education, and Recreation, 35:57-58, November-December, 1964.

H<sub>3</sub>: There will be no differences in mean spiking skill performance as a result of the experimental treatments.

H<sub>4</sub>: There will be no differences in mean passing skill performance as a result of the experimental treatments.

H<sub>5</sub>: There will be no differences in mean setting skill performance as a result of the experimental treatments.

## Chapter 2

### REVIEW OF THE LITERATURE

#### INTRODUCTION

More than three decades ago, studies were conducted to determine the effectiveness of instructional aids on the improvement of performance of specific sports-related skills. The first instructional aids utilized in studies found by this investigator were motion pictures which were used as analytic aids to supplement the regular instructional program. As technological advances were made in our society, more and more forms of instructional aids were used and tested in the area of motor skill acquisition. These aids included loop films, slides, filmstrips, Polaroid camera photographs, video tapes, and many others. In addition, technology paved the way for the invention of various instructional devices, including pitching machines, flotation devices, electronic simulation games, and other mechanical devices.

Various instructional aids and devices have been employed in the teaching of sports skills, physical activities, and manipulative skills. Many of these aids and

devices have been studied in attempts to ascertain their effectiveness as teaching techniques on the improvement of motor skill performance. A review of the literature presented below consists of studies related to the use of instructional aids and devices in the teaching of various motor skills. Studies are presented under the following headings: STUDIES RELATED TO INSTRUCTIONAL AIDS; STUDIES RELATED TO INSTRUCTIONAL DEVICES; and STUDIES RELATED TO INSTRUCTIONAL AIDS AND DEVICES USED IN THE TEACHING OF VOLLEYBALL SKILLS.

#### STUDIES RELATED TO INSTRUCTIONAL AIDS

Huselton attempted to determine the effectiveness of using the Polaroid camera in the teaching of archery. The experimental group consisted of ten subjects selected randomly from fifty students enrolled in the regular archery service courses. Their instruction was supplemented with photographs of their performance during classes. Results of a Scholastic Round administered as a pretest and posttest indicated that the experimental group did not differ significantly from the control group.<sup>1</sup>

Warr investigated the effects of three teaching methods on the learning of skills in beginning archery. The

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<sup>1</sup>Richard Lee Huselton, "The Effectiveness of Using the Polaroid Camera in the Teaching of Archery" (unpublished Master's thesis, Washington State University, Pullman, 1962).

following methods were employed by the investigator:

(1) traditional with oral instruction and demonstration only; (2) traditional including a self-teaching instructional film; and (3) traditional combined with the film plus video tapes of each student for reinforcement and analysis of performance. Analysis of the data revealed no significant differences at the .05 level among the three groups. Warr reached the following conclusions: (1) the use of instructional video tapes did not significantly improve performance when used as an aid; and (2) individual video-tape recordings, twice in an eight week period did not significantly improve performance when used in conjunction with the instructional film.<sup>2</sup>

Stephens used college women enrolled in two badminton classes to compare a traditional instruction method and the traditional method plus video-tape replays of performance. The findings revealed that video-tape replay did not aid in the acquisition of skill at the beginning level, but was of value if the skill level were high.<sup>3</sup>

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<sup>2</sup>Susan A. Warr, "The Effects of Three Teaching Methods on the Learning of Skills in Beginning Archery" (unpublished Master's thesis, Brigham Young University, Provo, Utah, 1974).

<sup>3</sup>Mary Walters Stephens, "An Evaluation of Video-tape Replay in the Acquisition of Perceptual Motor Skills in Beginning Badminton Classes" (unpublished Master's thesis, the University of Texas at Austin, 1972).

Zimmeran studied the effect of selected visual aids on the learning of badminton skills. Women physical education majors enrolled in two badminton classes served as subjects. The task method of instruction was used for both the control group and the experimental group. In addition, members of the experimental group viewed their own performance on video tape and the performance of experts on loop film. Analysis of the data showed no significant differences between the two groups. The investigator concluded that the task method of teaching augmented by video taped performance and loop films of expert performance was not superior to the task method without these visual aids.<sup>4</sup>

Gray and Brumbach investigated the value of loop film as a supplemental instructional aid in teaching selected badminton skills. Subjects used in this study were sixty college male undergraduates enrolled in four beginning badminton classes. Two of these classes were selected as the experimental group and the other two classes formed the control group. Both groups received traditional instruction consisting of demonstration, explanation, and practice. In addition, the experimental group viewed loop films pertaining to specific skills being taught during the second

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<sup>4</sup>Patricia A. Zimmeran, "The Effect of Selected Visual Aids on the Learning of Badminton Skills" (unpublished Doctoral dissertation, University of Iowa, Iowa City, 1970).

through the fifth weeks of instruction. Students displaying a skill deficiency were required to view the films during the seventh and eighth weeks. All other viewing of the loop films was on a voluntary basis. A battery of three separate skill tests was administered during the first, sixth, and tenth weeks. The results of testing during the sixth week indicated that the experimental group had made a significant improvement, but the control group had not. The results of the final test conducted during the tenth week showed no significant difference between the two groups; however, both groups had made significant improvements. The investigators concluded that viewing loop films of specific skills appeared to hasten the learning of badminton for male college students classified as beginning players.<sup>5</sup>

Winslade found that a class of ninth grade boys who were shown basketball skills on 8mm film made the same improvement, as measured by the Stroup Basketball test, as another ninth grade class which saw live demonstrations. Both groups showed significant improvement over a control group.<sup>6</sup>

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<sup>5</sup>Charles A. Gray and Wayne Brumbach, "Effect of Daylight Projection of Film Loops on Learning Badminton," Research Quarterly, 38:562-569, December, 1967.

<sup>6</sup>Donald Kenneth Winslade, "The Effect of 8mm Slow Motion Color Film on the Learning of Specific Motor Skills" (unpublished Master's thesis, University of British Columbia, Vancouver, 1963).

Carmichael used sixty male students enrolled in two college beginning bowling classes as subjects to determine the effectiveness of video-tape replay as a teaching technique in bowling. The experimental group utilized the video-tape recorder for self-analysis during the ten week period between pretests and posttests. Analysis of the data revealed no significant differences between the control group and the experimental group.<sup>7</sup>

Lockhart investigated the value of the motion picture as an aid in learning how to bowl. Freshmen college women were used for both the experimental and control groups. Both groups received standard methods of instruction. The film which was used only in the experimental group was the discriminating factor. Findings based on statistical procedures used in this study indicated the following: (1) the rate of improvement was more consistent in the experimental group than in the control group; (2) during the third week, the experimental group continued to improve at a rapid rate and the control group did not; and (3) the experimental group surpassed the control group and continued to be superior throughout the experimental period. Based on these findings, Lockhart

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<sup>7</sup>George Allen Carmichael, "Videotape Instant Replay as a Teaching Technique in Beginning Bowling Classes" (unpublished Master's thesis, Washington State University, Pullman, 1969).

concluded that the motion picture was of definite value as a supplement to the regular instructional program.<sup>8</sup>

Maynard found that slow motion film loops may be used as an effective substitute for teacher demonstrations in the teaching of beginning fencing skills. Using students in beginning fencing classes, a control group and an experimental group were formed. Teaching methods were the same except that slow motion films replaced teacher demonstrations in the experimental group. Results of skill tests revealed no difference between the groups.<sup>9</sup>

Spencer conducted a study to determine the relative effectiveness of movies, slides, and demonstrations as aids in teaching dance. Three groups of eleventh-grade girls received equal explanation of selected movement patterns. In addition, movies were shown to one group; still slides were shown to the second group; and the third group observed instructor demonstrations. A panel of judges was used to rate performance of the selected movement patterns at the end of the experimental period. Analysis of the data

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<sup>8</sup>Aileene Lockhart, "The Value of the Motion Picture as an Instructional Device in Learning a Motor Skill," Research Quarterly, 15:181-187, May, 1944.

<sup>9</sup>Jo Taft Maynard, "A Comparison of Two Methods of Teaching Fencing," (unpublished Master's thesis, Smith College, Northampton, Massachusetts, 1962).

revealed no significant differences in performance resulting from the instructional aids.<sup>10</sup>

Hawthorne investigated the effectiveness of the slow-motion picture in teaching golf. Two groups of women college students were used as subjects. The experimental group viewed their performance and received individual criticism. After a three week period of practice, all subjects were filmed again. A panel of judges rated all pictures without knowing the group to which the various subjects belonged. Statistical analysis of the ratings revealed that the experimental group's performance was significantly superior to that of the control group. Hawthorne concluded that slow-motion picture study was an effective teaching aid for improving golfers' form.<sup>11</sup>

Nelson studied the effect of slow-motion loop films on the learning of golf using two groups of beginning golf students as subjects. The experimental period covered five weeks and all the subjects received the same instructions. The experimental group treatment varied only by having the subjects view slow-motion loop films five minutes before each session. Nelson found that slow-motion loop films

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<sup>10</sup>Patricia May Spencer, "Movies, Slides, and Demonstrations as Aids in Teaching" (unpublished Master's thesis, University of Colorado, Boulder, 1961).

<sup>11</sup>Martha E. Hawthorne, "A Study of the Effectiveness of the Slow Motion Picture in Teaching Golf" (unpublished Master's thesis, Louisiana State University, Baton Rouge, 1964).

seemed to favor the learning of golf in the later stages of learning, but not in the early stages. Differences between the two groups were not significant. He concluded that, without undisputed evidence to the contrary, it is illogical to assume that anything is lost when slow-motion loop films are used and the possibilities for gains should not be ignored.<sup>12</sup>

Grechus found no significant difference between the control group and experimental group used in her study to ascertain the effects of video-tape replay on learning a headspring in gymnastics. Subjects for this study were college women enrolled in beginning gymnastics classes. Both groups received identical teaching methods except the experimental group received video-tape feedback. Judges were used to rate the performances.<sup>13</sup>

Plese compared the effect of using video-tape instant replay of performance with a conventional method of instruction in a study dealing with the teaching of selected gymnastics skills. Analysis of the data revealed a statistical significance beyond the .01 level in favor of the experimental group. In addition to progressing more

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<sup>12</sup>Dale O. Nelson, "Effect of Slow-Motion Loopfilms on the Learning of Golf," Research Quarterly, 29:37-45, March, 1958.

<sup>13</sup>Marilyn L. Grechus, "The Effects of Videotape Feedback on a Selected Skill in Gymnastics" (unpublished Master's thesis, Central Michigan, Mt. Pleasant, 1972).

rapidly, a higher percentage of the subjects in the experimental group completed routines.<sup>14</sup>

Tesch investigated the effects of visual aids and conventional instruction on learning selected gymnastics skills. The visual aids utilized in this study were single concept loop films of each skill and a performance film. She concluded that there was little overall benefit in using loop films and performance films in teaching the headstand, handstand, cartwheel, and round-off.<sup>15</sup>

Sullivan used two groups of junior high school girls in a study to determine the effectiveness of using the video-tape recorder in improving vaulting skills. The subjects in the control group were presented five vaults in a traditional teaching manner. The experimental group received the same treatment and, in addition, viewed on video tape, analyzed, and discussed their vaulting skills. Both groups received equal amounts of practice time.

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<sup>14</sup>Elliott R. Plese, "A Comparison of Videotape Replay with a Traditional Approach in the Teaching of Selected Gymnastics Skills" (unpublished Doctoral dissertation, Ohio State University, Columbus, 1967).

<sup>15</sup>Karen L. Tesch, "The Effect of Visual Aids and Conventional Instruction on Learning of Four Selected Gymnastics Skills" (unpublished Master's thesis, University of Wisconsin--LaCrosse, 1971).

Analysis of the data revealed no significant differences between the groups.<sup>16</sup>

Witenstein investigated the use of the video-tape recorder as an aid in teaching the cartwheel. Two groups received identical explanations, demonstrations, and spotting techniques in the performance of the cartwheel, except that the subjects in the experimental group were allowed to view several of their own performances on video tape. She found that both groups improved in their ability to perform the cartwheel, but neither group improved significantly more than the other.<sup>17</sup>

Wills studied the effects of different methods of instruction and practice on learning a motor skill. Freshman and sophomore college men were divided into the following instruction groups: (1) oral instruction with demonstration; (2) oral and loop film instruction; (3) written instruction; and (4) written and loop film instruction. Each instruction group was randomly assigned to physical practice or physical and mental practice. The motor task was learning to juggle three tennis balls. Wills

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<sup>16</sup>Valerie L. Sullivan, "Effectiveness of Using the Videotape Recorder in Improving Vaulting Skills" (unpublished Master's thesis, University of Washington, Seattle, 1972).

<sup>17</sup>Ann C. Witenstein, "The Use of the Videotape Recorder as a Teaching Aid" (unpublished Master's thesis, University of Maryland, College Park, 1970).

found that oral instruction with demonstration followed by physical practice resulted in the greatest skill acquisition. Written instruction with loop film and oral instruction with loop film, followed by physical practice, ranked second and third, respectively.<sup>18</sup>

Mansfield used female undergraduate, intermediate swimmers in a study to investigate the effects of using video tape and loop films as aids in teaching the breast stroke whip kick. The subjects were divided into a control and an experimental group. The control group received conventional instruction over a five week period. The experimental group received similar instruction, but viewed loop films of experts and video-tape replays of their own performances once weekly for three minutes in lieu of an equal amount of practice time. Findings revealed no significant differences between the groups; however, both groups did show improvement over the experimental period.<sup>19</sup>

Dressen investigated the value of loop film in teaching the crawl stroke. Junior high school students classified as non-swimmers were used as subjects in the

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<sup>18</sup>Keith C. Wills, "Effects of Different Methods of Instruction and Practice on Skill Acquisition of a Motor Task" (unpublished Doctoral dissertation, Texas A & M University, College Station, 1970).

<sup>19</sup>John R. Mansfield, "The Effects of Using Videotape and Loop Films as Aids in Teaching the Breast Stroke Whip Kick" (unpublished Master's thesis, the Pennsylvania State University, University Park, 1972).

study. Both the control and experimental groups had equal instruction in the crawl stroke. The experimental group had supplemental loop films for self-help and for helping the teacher to correct errors. No significant difference was found between the two groups.<sup>20</sup>

Camp examined the effects of viewing loop films on tennis skill and form while executing the forehand and backhand drive. The same teaching method was employed in both the control group and the experimental group, except the experimental group received the additional aid of viewing loop films. She concluded that the addition of loop film to the conventional method of teaching does not seem to facilitate the learning of tennis skills more than the conventional method itself.<sup>21</sup>

Paulat conducted a study to determine the effects of video-tape replay and loop film models on learning the forehand drive in tennis. College male and female students were used in the study. Analysis of the data revealed a significant improvement in the group receiving the

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<sup>20</sup>Clyda June Dressen, "The Value of a Loop Film in Teaching the Crawl Stroke" (unpublished Master's thesis, University of Colorado, Boulder, 1961).

<sup>21</sup>Barbara A. Camp, "The Effects of Viewing Loopfilms on Tennis Skill and Form" (unpublished Master's thesis, North Texas State University, Denton, 1969).

video-tape replay treatment; however, the loop film model treatment was not significant.<sup>22</sup>

Graves studied the effectiveness of the video-tape recorder in teaching the tennis serve. Form, speed, and accuracy of the serve were evaluated. Findings revealed that the group using the video-tape recorder (experimental group) was superior in form and speed. Both groups improved in form and speed, but declined in accuracy. She concluded that the video-tape recorder is beneficial in teaching the tennis serve and accuracy is not a factor in a successful serve at the beginning level.<sup>23</sup>

Irwin used three groups of college women who were beginning tennis players to investigate the effects of selected audio-visual aids on teaching tennis. Three different methods of instruction were employed to teach the forehand, backhand, and serve. One group was taught by the verbal-demonstration method; another group by this method plus a sound film and filmstrip; and the other group by the verbal-demonstration method plus a silent loop film. The investigator states the following conclusions: (1) the

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<sup>22</sup>James Gustav Paulat, "The Effects of Augmented Videotaped Information Feedback and Loop Film Models Upon Learning of a Complex Motor Skill" (unpublished Doctoral dissertation, Stanford University, Stanford, California, 1969).

<sup>23</sup>Judith M. Graves, "The Effectiveness of the Instant Videotape Recorder in Teaching the Tennis Serve" (unpublished Master's thesis, Lamar University, Beaumont, Texas, 1973).

three methods used were equally effective in improving the tennis playing ability and knowledge of college women; (2) each of the three methods produced highly significant improvements in tennis playing ability and tennis knowledge of college women; and (3) the results of the study offer no corroboration of the concept that the use of special audio-visual aids or visual aids was more effective in improving learning than a more traditional method which omitted these aids.<sup>24</sup>

Moore conducted a study to evaluate the effects of cartoon illustrations as an instructional aid in the teaching of basic tennis skills. She found that, although the cartoon illustrations did not result in the acquisition of a greater degree of knowledge, as measured by a written test, they were considered to be a valuable aid to teachers in their classroom preparations and in supplementing instruction.<sup>25</sup>

Penman, Bartz, and Davis examined the effects of teaching sports skills with and without an instant replay video-tape recorder. An experimental group and a control

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<sup>24</sup>June Irwin, "The Effects of Selected Audio-Visual Aids on Teaching Beginning Tennis Skill and Knowledge to College Women" (unpublished Doctoral dissertation, Indiana University, Bloomington, 1958).

<sup>25</sup>Ballard J. Moore, "Evaluation of a Pictorial Form of Instructional Aid in the Teaching of a Motor Skill" (unpublished Doctoral dissertation, Louisiana State University, Baton Rouge, 1970).

group composed of freshman students were taught a twelve week unit in beginning trampoline. The experimental group used the instant replay video-tape recorder. The investigators found no significant difference between the two groups; however, they felt that the use of the video-tape recorder was valuable in working with students who were having trouble learning a certain skill or stunt, and with better students.<sup>26</sup>

Brown and Messersmith attempted to measure the relative progress of tumbling classes taught with and without the use of motion pictures. Two classes in which beginning tumbling was being taught were used as a control group and an experimental group. The experimental group was shown motion pictures of experienced tumblers and later viewed motion pictures of themselves performing the same activities. Although the experimental class made a little more progress than did the control group, as measured by the scores on the final battery of tests, the difference was not statistically significant.<sup>27</sup>

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<sup>26</sup>Kenneth A. Penman, Douglas Bartz, and Rex Davis, "Relative Effectiveness of an Instant Replay Videotape Recorder in Teaching Trampoline," Research Quarterly, 39:1060-1062, December, 1968.

<sup>27</sup>Howard Steven Brown and Lloyd Messersmith, "An Experiment in Teaching Tumbling With and Without Motion Pictures," Research Quarterly, 19:304-307, July, 1948.

Drury conducted a study for the purpose of evaluating three visual aids in the teaching of tumbling. College men enrolled in nine classes used 8mm slow motion pictures as a visual aid; three used drawings; and three used an average tumbler in action. Drury concluded that the three types of visual aids were equally effective in teaching tumbling.<sup>28</sup>

Douglas attempted to ascertain the value and limitations of loop films in the teaching of wrestling. An experimental group received instruction through loop films and explanation, while the control group was taught by the conventional explanation-demonstration method. Analysis of the data indicated that significantly greater proficiency was not attained by the group taught with loop films.<sup>29</sup>

Findings in the twenty-nine studies reviewed in the area of instructional aids indicated that: (1) in 72 percent of the studies no significant differences were found; (2) in 14 percent of the studies significant differences were reported; and (3) 14 percent of the studies reported mixed findings.

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<sup>28</sup>Francis A. Drury, "An Evaluation of Visual Aids in the Teaching of Tumbling" (unpublished Doctoral dissertation, State University of Iowa, Iowa City, 1959).

<sup>29</sup>John G. Douglas, "The Value and Limitations of Loop Movies in the Teaching of Wrestling at the University of Massachusetts" (unpublished Master's thesis, Springfield College, Springfield, Massachusetts, 1963).

## STUDIES RELATED TO INSTRUCTIONAL DEVICES

Brown conducted a study to determine the effect of augmenting regular instruction with the use of a suspended shuttle device in learning the overhead clear and the smash. Subjects used for the study were freshman college women who were beginners in badminton. She concluded that the device was beneficial in developing the clear and smash strokes.<sup>30</sup>

Britt used college students who were non-skilled in baseball to determine the effect of mechanical devices on hitting a baseball. The devices used in this study were the Curvemaster Pitching Machine, the Dudley Olympia Pitching Machine, and the Batting Tee. Pretest and posttest performances were measured by a Swing-Rite hitting instrument. Differences between gains were compared among the four groups being tested. Findings indicated that twenty practice sessions with the Batting Tee improved hitting performance of non-skilled players, while twenty practice sessions with the Dudley Olympia and Curvemaster Pitching Machine did not improve performance.<sup>31</sup>

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<sup>30</sup>Dulcie Patricia Brown, "The Effects of Augmenting Instruction with an Improvised Teaching Aid for College Women in Learning Selected Badminton Skills" (unpublished Doctoral dissertation, Indiana University, Bloomington, 1969).

<sup>31</sup>Bobbie G. Britt, "A Comparison of the Effect of Mechanical Teaching Aids on Hitting a Baseball" (unpublished Doctoral dissertation, Texas A & M University, College Station, 1974).

Fisk investigated the development of basketball shooting accuracy as affected by varying goal sizes. Thirty-seven male freshmen were divided into three experimental groups. Each group practiced at either an accuracy rim, a regulation basket, or a combination of the regulation basket and accuracy rim. The method of shooting was a one-hand set shot. Results of the study indicated that there was no significant difference in shooting accuracy. Only the standard goal combined with the accuracy goal rim showed a significant improvement from pretest to posttest.<sup>32</sup>

Henschen, using junior high school boys and girls as subjects, investigated the effects of a small basket upon basketball shooting accuracy with the nondominant hand. The analysis of data revealed that boys and girls practicing at the small basket improved significantly more in shooting accuracy than those who practiced at the regulation basket. Henschen concluded that the small basket training device was more of a beneficial aid for developing lay-up shooting

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<sup>32</sup>Timothy B. Fisk, "Development of Basketball Shooting Accuracy as Affected by Varying Goal Sizes" (unpublished Master's thesis, South Dakota State University, Brookings, 1967).

accuracy with the nondominant hand for junior high school boys and girls than practice at a regulation basket.<sup>33</sup>

Layton attempted to discover the effects of a basketball training glove on shooting accuracy. Senior high school boys classified as players and non-players were used as subjects. No evidence was found that a basketball training glove aided in increasing shooting accuracy.<sup>34</sup>

Lindeburg and Hewitt conducted a study to determine whether using a larger and heavier than regulation basketball would affect shooting ability and ball handling. Twenty-six male junior varsity and varsity basketball players were used as subjects. They found that an oversized basketball had no effect on shooting short shots and foul shots or on the dribble test and concluded that the experimental basketball used in the study would have no appreciable effect on the basketball skills of shooting and ball handling.<sup>35</sup>

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<sup>33</sup>Keith Page Henschen, "The Effects of a Small Basket Upon Basketball Shooting Accuracy with the Nondominant Hand" (unpublished Doctoral dissertation, Indiana University, Bloomington, 1971).

<sup>34</sup>Terry Wayne Layton, "The Effects of a Basketball Training Glove on Shooting Accuracy" (unpublished Master's thesis, Mankato State College, Mankato, Minnesota, 1971).

<sup>35</sup>Franklin A. Lindeburg and Jack E. Hewitt, "Effect of an Oversized Basketball on Shooting Ability and Ball Handling," Research Quarterly, 36:164-167, May, 1965).

Cox studied the effectiveness of using an electronic device in the development of beginning bowling skills. This device is called a "Hot Spot" and is used to help bowlers aim at the one-three pocket. Eighty college women enrolled in five beginning bowling classes were used as subjects. These subjects were divided into two groups, one group serving as a control group. Both groups received identical instruction, but the experimental group bowled on lanes with the electronic device. She found that the electronic aid appeared quite effective in helping the beginning bowler to aim at the one-three pocket.<sup>36</sup>

Nyce conducted a study using a lightweight plastic bowling ball as an instructional device to determine its effects upon various stages of learning beginning bowling. Two groups of beginning bowlers received identical instruction, except that the experimental group used the lightweight plastic ball during the first six weeks of the fourteen week period. The control group used a conventional ball throughout the study. Results of the findings showed that both groups improved in their bowling ability, but the

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<sup>36</sup>Gay Anne Cox, "The Effectiveness of Instruction Using a Visual Electronic Unit in the Development of Beginning Bowling Skill of College Women" (unpublished Master's thesis, University of Washington, Seattle, 1963).

use of the lightweight ball did not bring about any differences between the two groups.<sup>37</sup>

Dailey, Wessel, and Nelson investigated the effectiveness of the Alley Spotting Target as an aid to improve instructional procedures for university students in beginning bowling classes. This device was designed and made by the R & M Bowling School and is manufactured by the R & M Manufacturing Corporation. The purpose of this device is to help develop accuracy in spot bowling. The investigators found that the use of the Alley Spotting Target as employed in both the pilot and experimental study failed to bring about better bowling performance. They concluded that within the limitations of their research they question the merits of this device.<sup>38</sup>

Mathews and McDaniel studied the effectiveness of the Golf-Lite in assisting college students to hit a target 150 yards away with a five iron. The Golf-Lite is a device consisting of a small light and a 6-volt battery. The light is attached to the shaft of the club near the club head. The purpose of this device is to form an after-image effect

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<sup>37</sup>Lawrence G. Nyce, "The Effect of a Light-Weight Bowling Ball Upon Various Stages of Learning Beginning Bowling" (unpublished Master's thesis, University of Maryland, College Park, 1969).

<sup>38</sup>Lucille Dailey, Janet Wessel, and Richard C. Nelson, "Effectiveness of a Bowling Aid to University Bowling Instruction," Research Quarterly, 34:136-143, May, 1963.

so a person will see an arc of light reflected from the hitting surface through the hitting zone. Mathews and McDaniel concluded from the data that the Golf-Lite was beneficial to most of the students.<sup>39</sup>

Chui compared the effectiveness of Golf-O-Tron to the conventional practice range method in relation to improvement in skill. The Golf-O-Tron is an electronic teaching device which simulates the game of golf through the use of a modified missile tracking computer coupled with color photography of a selected golf course. Regulation clubs and balls are used. After each shot, the exact yardage the ball would have traveled and the approximate position on the fairway are instantly shown. Subjects used in the study were men and women who were enrolled in golf activity classes. The subjects were divided into four groups. Two of the four groups were used as control groups, one male and one female. Before initial skill testing, four class sessions were allotted to basic instruction in grip, stance, and swing. Eight class sessions were devoted to instruction and practice time before the final testing of skills. Chui found that improvement in skill through the use of either the Golf-O-Tron or the conventional practice range methods is significant after a four week instruction

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<sup>39</sup>Donald K. Mathews and Joe McDaniel, "Effectiveness of Using Golf-Lite in Learning the Golf Swing," Research Quarterly, 33:486-491, October, 1962.

period, but one method was not significantly greater than the other at the .05 level.<sup>40</sup>

Kaye conducted a study to determine the relative merits of learning to swim with a waist-type flotation device as opposed to learning to swim with no flotation device. Subjects used in this study were male college students whose ability to swim ranged from those who could swim nine feet to those who could not swim at all. Analysis of the data revealed that both the control group and the experimental group were able to swim at the end of the experimental period, but the group using the waist-type flotation device was able to swim further than the group not using this device. Based on the findings of this study, Kaye concluded that the use of a waist-type flotation device is of definite value in helping the beginning swimmer.<sup>41</sup>

McCatty studied the effects of the use and non-use of a flotation device on the ability of freshman university male non-swimmers to learn to swim. An egg-shaped polystyrene foam plastic product was the flotation device used in this investigation. Subjects were divided into four groups taught by two different qualified Red Cross

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<sup>40</sup>Edward F. Chui, "A Study of Golf-O-Tron Utilization as a Teaching Aid in Relation to Improvement and Transfer," Research Quarterly, 36:147-152, May, 1965.

<sup>41</sup>Richard A. Kaye, "The Use of a Waist-Type Flotation Device as an Adjunct in Teaching Beginning Swimming Skills," Research Quarterly, 36:277-281, October, 1965.

instructors. Each instructor was in charge of two groups and utilized the traditional method with one group and the flotation method with the other group. After an analysis of the data, McCatty concluded that the findings failed to provide evidence to support the hypothesis that the use of a flotation device will accelerate the learning process.<sup>42</sup>

Bruce investigated the effects of two teaching techniques, conscious relaxation and a flotation device, on learning beginning swimming. She used criterion tests that yielded two measures, a time score and a rating score. The analysis of time scores showed no significant differences between the use and non-use of the flotation device; however, analysis of the rating scores showed a significant difference in favor of non-use of a flotation device.<sup>43</sup>

Sevier used boys and girls, ages eight to ten, as subjects in a comparative study of teaching swimming skills to beginners. The subjects were divided into two groups, one group being taught with the use of Styrofoam swimming

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<sup>42</sup>Cressy A. M. McCatty, "Effects of the Use of a Flotation Device in Teaching Nonswimmers," Research Quarterly, 39:621-626, October, 1968.

<sup>43</sup>Patricia J. Bruce, "The Effects of Conscious Relaxation and a Flotation Device on Learning Beginning Swimming" (unpublished Doctoral dissertation, Indiana University, Bloomington, 1961).

bubbles and kick boards. He found no significant difference between the two groups.<sup>44</sup>

Hart studied the effectiveness of an instructional device, the "Stroke Builder," on the improvement of performance of the backhand drive in tennis. Four beginning tennis classes were used as subjects. Two classes used the "Stroke Builder" and two classes used traditional practice methods. Analysis of the data revealed statistically significant improvement at the .05 level in the experimental classes.<sup>45</sup>

Rohland used high school subjects in a study to determine the effectiveness of instructional devices in beginning tennis. The subjects were placed into equated groups based on the Broer-Miller Forehand and Backhand Tennis Test scores obtained after a period of basic instruction. The same tests were used as posttests. The experimental group practiced with Stroke Developers and Tethered Balls, while the control group practiced without these devices. Analysis of the data revealed that both groups made significant gains at the .01 level, but there was no significant difference between the groups at the .05

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<sup>44</sup>Vernon A. Sevier, "A Comparative Study of Teaching Swimming Skills to Beginners" (unpublished Master's thesis, University of Maryland, College Park, 1969).

<sup>45</sup>Douglas W. Hart, "Effectiveness of the 'Stroke Builder' as a Tennis Backhand Learning Aid" (unpublished Master's thesis, Ithaca College, Ithaca, New York, 1971).

level. Rohland concluded that, although not significantly better, training with the instructional devices was at least as effective as training without such devices and made tennis instruction possible with limited facilities.<sup>46</sup>

Solley and Borders conducted a study to determine the relative effects of two methods of teaching tennis. This study compared student progress in the forehand drive when taught by the traditional method supplemented by the use of the Ball-Boy, a machine which projects tennis balls toward the learner at regular intervals with controlled speed and direction of trajectory. Analysis of the data revealed that gains made in the forehand drive for all students under the Ball-Boy emphasis were greater than the gains made by all students under the traditional methods. The investigators made the following conclusions: (1) teaching machines such as the Ball-Boy are highly valuable in teaching specific skills in beginning tennis classes; and (2) in normal size classes such devices aid significantly in achievement of these skills.<sup>47</sup>

Of the eighteen studies reviewed in the area of instructional devices, 39 percent revealed significant

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<sup>46</sup>Dale Arthur Rohland, "Instructional Aids in Tennis" (unpublished Master's thesis, University of California, Los Angeles, 1960).

<sup>47</sup>William H. Solley and Susan Borders, "Relative Effects of Two Methods of Teaching the Forehand Drive in Tennis," Research Quarterly, 36:120-122, March, 1965.

differences in favor of the utilization of instructional devices; 50 percent revealed no significant differences; and 11 percent reported mixed findings.

STUDIES RELATED TO INSTRUCTIONAL AIDS  
AND DEVICES USED IN THE TEACHING  
OF VOLLEYBALL SKILLS

Reid investigated the effects of using the video-tape recorder as an aid in teaching the volleyball serve. She attempted to determine whether there was a difference in volleyball serving ability at the end of a five week instructional period between a group of college women taught how to serve by means of a teaching method using the video-tape recorder and another group taught the same skill by a conventional method. The results indicated that both groups improved significantly in serving ability, but there was no significant difference between the groups.<sup>48</sup>

Buzbee compared two methods of practicing the set-up in volleyball to determine whether one method was more effective than the other. Both methods utilized a rope target, floor target, and restraining lines placed in such a position as to encourage performance of a good set-up. The experimental method included an additional device in the

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<sup>48</sup>Dianne A. Reid, "The Effects of the Use of the Videotape Recorder as an Aid in Teaching the Volleyball Serve" (unpublished Master's thesis, the Pennsylvania State University, University Park, 1970).

form of a hoop to provide a goal for accuracy. Comparisons of pretest and posttest scores revealed no significant differences between the control group and the experimental group. She concluded that both the experimental method and the control method of practice were effective in terms of acquisition of skill in setting the ball for a spike.<sup>49</sup>

Adams conducted a study to investigate the effectiveness of using a lightweight plastic ball in the overhead volley in volleyball. The control group used regulation volleyballs, while the experimental group used plastic balls to practice overhead volleys. Findings revealed a significant difference between pretest and posttest scores on the wall volley test for the control group. No change was found for the experimental group.<sup>50</sup>

No significant differences in favor of the use of instructional aids and devices in the teaching of volleyball were found by the investigator.

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<sup>49</sup>Betty R. Buzbee, "Two Methods of Practicing the Set-Up in Volleyball" (unpublished Master's thesis, Southern Illinois University, Carbondale, 1971).

<sup>50</sup>Alice Adams, "A Study to Investigate the Effectiveness of Using a Lightweight Plastic Ball in Teaching the Overhead Volley in Volleyball" (unpublished Master's thesis, University of North Carolina at Greensboro, 1971).

### SUMMARY STATEMENT

While research in the areas of instructional aids and devices as they relate to the teaching of motor skills is quite extensive, there is a scarcity of reported research when one concentrates on any one instructional aid or device utilized in any one sport or physical activity. The effects of various instructional aids and devices used in teaching more than twenty different sports-related skills and physical activities have been investigated. Although most of the studies cited do not disprove the advantages of using such techniques, it is evident that no one technique, particular aid, or device guarantees positive outcomes. Regarding the review of the literature concerning the use of instructional aids and devices in the teaching of volleyball skills, this investigator had little success in finding research pertaining to this area. The lack of research reported in this area prompted the investigator to pursue this study in hopes of contributing to the present knowledge pertaining to the value of the utilization of instructional aids and devices as techniques in the teaching of volleyball.

## Chapter 3

### PROCEDURES

#### INTRODUCTION

This chapter is concerned with the procedures used in the collection and treatment of the data for this investigation. Procedures for this study are described under the following headings: SUBJECTS, EXPERIMENTAL PERIOD, GROUP TREATMENTS, INSTRUCTIONAL PROCEDURES, TESTING INSTRUMENTS, TESTING PROCEDURES, AND STATISTICAL PROCEDURES.

#### SUBJECTS

The subjects for this study were fifty-one (51) male and female students enrolled in three volleyball service classes at Pembroke State University during the second half of the Fall Semester of the 1977-78 academic year. The ages of the subjects ranged from seventeen to thirty-two years with a mean age of twenty years. Group I (Traditional), Group II (Instructional Devices), and Group III (Instructional Aids), were composed of sixteen, twenty, and fifteen subjects, respectively. Groups I and II met on Mondays and Wednesdays at 12:00 noon and 1:00 p.m.,

respectively. Group III met on Tuesdays and Thursdays at 12:30 p.m. All classes were conducted in the Auxiliary Gymnasium in the Health and Physical Education Center and were taught by the investigator.

A background data form was completed by all the subjects during the first class meeting. This form provided the following information: name, age, sex, height, weight, classification, day and time of class meeting, section number, college physical education courses completed, high school and college varsity experiences, high school and college intramural experiences, and the amount of previous volleyball experience (see Appendix D). An explanation of the research was read to all students. Each student was informed that he or she could be eliminated from the study for the following reasons: (1) varsity or club volleyball team experience, (2) failure to take the pretest or posttest or any intervening tests administered during the study, and (3) missing two or more class meetings.

#### EXPERIMENTAL PERIOD

The investigation was conducted during regularly scheduled class meetings. The experimental period covered six weeks. Each class met twice a week for fifty minutes per class meeting. The experimental period followed the outline below:

1st Meeting. Course orientation, explanation of the study including what expectations there would be of the subjects, completion of the background data form, and a description of the test to be administered during the next class meeting.

2nd Meeting. Administration of the Cunningham and Garrison High Wall Volley Test to determine the initial homogeneity of general volleyball ability among the three groups being tested and introduction to the selected skills.

3rd and 4th Meetings. Administration of pretests for the skills of spiking, passing, and setting.

5th through 9th Meetings. Instruction, drills, practice, and participation in games utilizing the selected skills previously introduced; video taping, loop film and tape observations, and the utilization of the Spike-It and harnessed ball devices occurred during these class meetings.

10th through 12th Meetings. Administration of post-tests for general volleyball ability, spiking, passing, and setting.

#### GROUP TREATMENTS

The experimental groups used in the study were three volleyball classes scheduled as part of the regular physical education service program at Pembroke State University. Each group (class section) was randomly assigned a group

number prior to being randomly assigned to one of three treatments.

Group I, Traditional Treatment. This treatment consisted of explanations, demonstrations by the instructor, practice, drills, and lead-up games. No instructional devices or aids, with the exception of the equipment normally required to play volleyball, were used in this treatment. A textbook was required for all classes.

Group II, Traditional Treatment Supplemented with Instructional Devices. This treatment consisted of traditional instruction plus the utilization of certain instructional devices. These devices were employed in the demonstration, practice, and drill phases of the lesson plans. The devices used in this treatment included: (1) the Spike-It and harnessed ball devices for teaching the spike and (2) volleyball goals for teaching the skills of passing and setting.

Group III, Traditional Treatment with Selected Instructional Aids. This treatment consisted of traditional instruction plus the utilization of certain instructional aids. These aids were 8mm loop films produced by the Athletic Institute (see Appendix E) and video-taped performances of the subjects being studied. The loop films were used to introduce the various fundamental skills of volleyball, served as a source of demonstrations of skill techniques, and offered the subjects a means of comparing

their taped performances with performances demonstrated in the loop films.

### INSTRUCTIONAL PROCEDURES

All instruction and testing was conducted or supervised by the investigator. The three groups under study were given the same basic instruction at the beginning of each class meeting according to the lesson plan for the day. This was done to provide each class with the same information. The gymnasium contained three volleyball courts marked so that all three courts could be used simultaneously. Video taping, replay observation, loop film observation, and testing were conducted in the Auxiliary Gymnasium.

During the first class meeting, each student completed a background data form to gather information to be used by the investigator at a later date in an attempt to determine whether sex, previous experiences in other physical education activity classes, or participation in varsity or intramural programs affected the degree of improvement in volleyball skills. During the second, third, and fourth class meetings, pretests on general volleyball ability, spiking, passing, and setting were administered to each group. Posttests were administered during the tenth, eleventh, and twelfth class meetings. All testing was done under the same conditions for all the subjects.

The subjects used were assigned to class sections according to their choice either during preregistration or registration for the Fall Semester. These class sections were then randomly assigned a group number. After a group number was assigned, a treatment was randomly assigned to each of the three groups.

Group I received traditional instruction which consisted of lectures, demonstrations by the instructor, practice, drills, and lead-up games. This group did not use any of the selected instructional devices or aids.

Group II, the class using instructional devices, received the same treatment as the group receiving traditional instruction, but the treatment varied in that Group II utilized volleyball goals for practicing the skills of setting and passing, and used the Spike-It and harnessed ball devices for practicing the spike. Prior to the first class meeting, subjects in this group were randomly assigned to four subgroups of five subjects each. Each subgroup was assigned to one of four volleyball goal stations to practice the skills of passing and setting. The same subgroups were assigned to the Spike-It and three harnessed ball devices to practice the skill of spiking. The subgroups were rotated at seven-minute intervals so that all subjects had equal time on the Spike-It. The Spike-It and the harnessed ball devices served the same function of holding a ball stationary at various levels.

Group III, the group utilizing instructional aids, received the same treatment as the group receiving traditional instruction except that this group's treatment was supplemented with loop films and video-taped performances of the subjects. Prior to the first class meeting, Group III was randomly assigned to four subgroups consisting of three or four subjects each. Subjects in this group observed loop films and were video taped at each class meeting beginning with the fifth meeting and continuing through the ninth meeting. At the beginning of each class meeting, the entire class observed a loop film or films appropriate to the skills introduced or reviewed in the daily lesson plan. After viewing the film or films, the investigator demonstrated the given skill or skills and the subjects entered the practice areas until their subgroups were called to the video taping and replay station. After viewing the film or films and practicing a given skill, the performance of each subject in each subgroup was video taped and replayed with instructor feedback. Each subject was video taped performing the skills of passing and setting from a side view, a three-quarter view, and a front view. The skill of spiking was video taped from the beginning of the subject's approach until the ball was spiked at the net. This performance was taped with the camera angle parallel to the net with the subject approaching the net diagonally. Immediately following the replay, the subject viewed the

appropriate film as a member of a subgroup. Each subject was taped twice during each class meeting and viewed the loop film twice as a member of a subgroup, in addition to viewing the loop film as a member of the class at the beginning of each class meeting. In summary, each subgroup consisting of three or four subjects each reported to the video taping and replay station, rotated to the loop film station, and returned to the practice areas before being taped the second time.

#### TESTING INSTRUMENTS

Although volleyball skills tests have been recorded as early as 1930,<sup>1</sup> this investigator experienced great difficulty in finding tests that would be appropriate for use in this study. Most tests were rejected for the following reasons: (1) lack of information concerning reliability and/or validity, (2) they were not administratively feasible, or (3) they were designed to measure skills no longer permitted by current rules.

After a careful review of the literature, the following instruments were selected for use in this study: (1) Cunningham and Garrison High Wall Volley Test, (2) AAHPER Passing Test, (3) AAHPER Set-Up Test, and (4)

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<sup>1</sup>Herbert J. Reynolds, "Volleyball Tests," Journal of Health and Physical Education, 1:42, March, 1930.

Sandefur Spiking Test. The purpose of the High Wall Volley Test is to measure general volleyball playing ability and has a reliability coefficient of .87 and a validity coefficient of .72.<sup>2</sup>

The tests selected to measure passing and setting ability were the AAHPER Volleyball Passing and Set-Up Tests. These tests were developed under the guidance of a skill test committee appointed by the Board of Directors, the American Association of Health, Physical Education, and Recreation.<sup>3</sup> According to Johnson and Nelson, in the criteria for the AAHPER Sports Skills Test Project, the reliability coefficients should not be less than .80 on events scored on distance and not less than .70 for events scored on the basis of accuracy and form. They further state that face validity was accepted.<sup>4</sup> Based on this information, this investigator assumed that these two tests have reliability coefficients of at least .70 and face validity. The purpose of the Passing Test is to measure

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<sup>2</sup>Phyllis Cunningham and Joan Garrison, "High Wall Volley Test for Women's Volleyball," Research Quarterly, 39:486-490.

<sup>3</sup>N. P. Neilson and Clayne R. Jensen, Measurement and Statistics in Physical Education (Belmont, California: Wadsworth Publishing Company, Inc., 1972), pp. 260-261.

<sup>4</sup>Barry L. Johnson and Jack K. Nelson, Practical Measurements for Evaluation in Physical Education (Minneapolis, Minnesota: Burgess Publishing Company, 1974), p. 269.

the player's skill in passing a volleyball from the rear of the court toward the net. The purpose of the Set-Up is to measure the player's ability to set-up the ball near the net.<sup>5</sup>

The test selected to measure spiking ability was the Sandefur Spiking Test. This test was developed by Randy Sandefur of California State College at Long Beach.<sup>6</sup> This test was proven reliable and valid in a study conducted by Kissler. According to the findings of Kissler, this test has a reliability coefficient of .96 and a validity coefficient of .81.<sup>7</sup> This test measures agility, power, and timing skills utilized in the spike, but does not indicate jumping ability.<sup>8</sup> Detailed descriptions and diagrams of these tests appear in Appendix F.

#### TESTING PROCEDURES

Since this study was designed to investigate the effectiveness of selected instructional devices and aids on

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<sup>5</sup>Mary Jane Haskins, Evaluation in Physical Education (Dubuque, Iowa: Wm. C. Brown Company, 1971), pp. 171-172.

<sup>6</sup>Randy Sandefur, Volleyball (Pacific Palisades, California: Goodyear Publishing Company, Inc., 1970), p. 72.

<sup>7</sup>Adrian Anthony Kissler, "The Validity and Reliability of the Sandefur Volleyball Spiking Test" (unpublished Master's thesis, California State College at Long Beach, 1968), p. 33.

<sup>8</sup>Sandefur, p. 72.

the improvement of general volleyball playing ability and three specific patterns of play consisting of the pass, set-up, and spike, four skill tests were used to assess entering and exiting behavior in each of these areas. The tests selected for this study were: (1) Cunningham and Garrison High Wall Volley Test, (2) AAHPER Volleyball Passing Test, (3) AAHPER Volleyball Set-Up Test, and (4) Sandefur Spiking Test. Data collected from pretests and posttests were analyzed to ascertain the improvement within and among the three groups being studied in the following areas: (1) general volleyball playing ability, (2) passing ability, (3) setting ability, and (4) spiking ability. The Cunningham and Garrison High Wall Volley Test was used to determine initial homogeneity among the three groups.

During the second class meeting, the High Wall Volley Test was administered to determine initial homogeneity of skill among the three groups and as a pretest of general volleyball playing ability. A posttest was conducted during the tenth class meeting to determine whether general volleyball playing ability had increased within and among the groups.

During the third and fourth class meetings, three pretests were administered to assess ability in passing, setting, and spiking. Posttests were administered during the eleventh and twelfth class meetings to determine improvement within and among the three groups in the three

skills previously mentioned. The tests used to measure these three skills were the AAHPER Volleyball Passing Test, the AAHPER Volleyball Set-Up Test, and the Sandefur Spiking Test.

#### STATISTICAL PROCEDURES

The .05 level was utilized to determine significance for all statistical analysis conducted in this study. A preliminary analysis for homogeneity among the three groups in the skills of general volleyball ability, spiking, passing, and setting was performed through the use of a series of four one-way analyses of variance (ANOVAs) comparing the pretreatment scores of the three groups. A significant difference was revealed in passing ability. Because of this difference, the pretreatment and post-treatment scores for the three groups on the skill of passing were plotted to determine whether the rate of improvement among the groups was equivalent. After equivalency was established, a one-way ANOVA for difference (posttest minus pretest) scores was conducted. Because homogeneity for the other skills was established in the preliminary analysis, traditional one-way ANOVAs were conducted to analyze the posttreatment scores.

The ANOVA on difference (posttest minus pretest) scores on the skill of passing revealed a significant

difference among the three groups. Scheffé's test was utilized to determine where the significant difference existed.

To determine if there were a significant improvement within each group in each skill, t tests were conducted.

## Chapter 4

### ANALYSIS OF THE DATA

The purpose of this chapter is to report the results of the statistical analyses performed on the data collected relative to improvement in selected volleyball skills as determined by performance scores on four skills tests. For each subject in each of three groups, pretreatment and post-treatment scores (see Appendix G) were collected on four selected volleyball skills including: (1) general volleyball ability, (2) spiking, (3) passing, and (4) setting. The three groups were subjected to three types of treatment as follow: (1) traditional treatment, (2) traditional supplemented with instructional devices, and (3) traditional supplemented with instructional aids.

Since the groups were composed of intact classes predetermined by patterns of registration rather than being randomly assigned, it was necessary to test for homogeneity among the groups. The mean pretreatment scores on each skill for each group are shown in Table 1. The preliminary analysis for homogeneity consisted of four one-way analyses of variance (ANOVAs) comparing pretreatment scores of the three groups of subjects on the four abilities previously

Table 1

Group Means for Pretreatment Scores on Four Volleyball Skills  
for Group I, Group II, and Group III

Skills	Group I Traditional	Group II Devices	Group III Aids
General Volleyball Ability	11.12	12.40	8.33
Spiking	5.00	5.40	5.53
Passing	4.44	6.30	3.40
Setting	4.00	3.90	3.27

mentioned. The appropriate analysis of variance method as suggested by Winer<sup>1</sup> was used.

The results of the preliminary analyses showed no significant differences in pretreatment performance scores of the three groups except in the test for the skill of passing. Specifically, the three groups appeared to be initially homogeneous in all skills with the exception of passing ability. Summary ANOVAs of the preliminary analyses are shown in Tables 2, 3, 4, and 5.

Because homogeneity was established for the three skills of general volleyball ability, spiking, and setting, traditional one-way ANOVAs were utilized in analyzing the posttreatment scores for these skills. Based on the difference in pretreatment scores for passing, it was

<sup>1</sup>B. J. Winer, Statistical Principles in Experimental Design (New York: McGraw-Hill Book Company, 1962), p. 22.

Table 2  
 Analysis of Variance of General Volleyball Ability  
 Pretreatment Scores for Groups I, II, and III

Source	SS	df	MS	F
Total	2618.00	50	--	--
Between Groups	144.00	2	72.00	1.40*
Within Groups	2474.00	48	51.54	--

\*F for P of .05 = 3.23

Table 3  
 Analysis of Variance of Spiking Pretreatment  
 Scores for Groups I, II, and III

Source	SS	df	MS	F
Total	1085.00	50	--	--
Between Groups	2.00	2	1.00	.04*
Within Groups	1083.00	48	22.56	--

\*F for P of .05 = 3.23

Table 4  
 Analysis of Variance of Passing Pretreatment  
 Scores for Groups I, II, and III

Source	SS	df	MS	F
Total	464.00	50	--	--
Between Groups	76.00	2	38.00	4.70*
Within Groups	388.00	48	8.08	--

\*F for P of .05 = 3.23

Table 5  
 Analysis of Variance of Setting Pretreatment  
 Scores for Groups I, II, and III

Source	SS	df	MS	F
Total	256.00	50	--	--
Between Groups	5.00	2	2.50	.48*
Within Groups	251.00	48	5.23	--

\*F for P of .05 = 3.23

determined that another analysis would have to be used. Pretreatment and posttreatment scores for the three groups on passing ability were plotted according to Edwards.<sup>2</sup> This graph revealed that the rate of improvement of the three groups, as evidenced by slope of the best fitting line, was equivalent. It was determined, therefore, that a one-way ANOVA for difference scores (postscores minus prescores), as suggested by Winer,<sup>3</sup> could be used legitimately for the test scores on passing.

The mean posttreatment scores on each skill for each group are shown in Table 6.

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<sup>2</sup>A. L. Edwards, Experimental Design in Psychological Research (New York: Holt, Rinehart and Winston, 1960), p. 296.

<sup>3</sup>Winer, p. 22.

Table 6

Group Means of Posttreatment Scores on Four Volleyball Skills  
for Group I, Group II, and Group III

Skills	Group I Traditional	Group II Devices	Group III Aids
General Volleyball Ability	16.19	19.80	14.40
Spiking	9.69	9.80	10.07
Passing	7.12	8.05	8.40
Setting	5.62	7.65	5.73

The ANOVA on general volleyball ability posttreatment scores (Table 7) revealed no significant differences among the three groups relative to the treatments used.

Table 7

Analysis of Variance of General Volleyball Ability  
Posttreatment Scores for Groups I, II, and III

Source	SS	df	MS	F
Total	1583.00	50	--	--
Between Groups	1.00	2	.50	.01*
Within Groups	1582.00	48	32.56	--

\*F for P of .05 = 3.23

The ANOVA on the spiking ability posttreatment scores is found in Table 8. No significant differences were observed among the three groups as a result of the treatments utilized.

Table 8

Analysis of Variance of Spiking Posttreatment  
Scores for Groups I, II, and III

Source	SS	df	MS	F
Total	1583.00	50	--	--
Between Groups	1.00	2	.50	.01*
Within Groups	1582.00	48	32.96	--

\*F for P of .05 = 3.23

Table 9 contains the ANOVA summary for the setting posttreatment scores. No significant differences were revealed among the three groups as a result of the treatments used.

Table 9

Analysis of Variance of Setting Posttreatment  
Scores for Groups I, II, and III

Source	SS	df	MS	F
Total	479.00	50	--	--
Between Groups	48.00	2	24.00	2.67*
Within Groups	431.00	48	8.98	--

\*F for P of .05 = 3.23

The ANOVA on difference (posttest minus pretest) scores on the passing ability revealed a significant

difference among the three groups ( $F = 4.15$ ,  $P \leq .05$ ). This ANOVA is depicted in Table 10.

Table 10

Analysis of Variance of Difference (Posttest Minus Pretest)  
Scores on Passing for Groups I, II, and III

Source	SS	df	MS	F
Total	630.00	50	--	--
Between Groups	93.00	2	46.50	4.15*
Within Groups	537.00	48	11.19	--

\*F for P of .05 = 3.23

After a significant difference was found among the three groups on the skill of passing, it became necessary to determine where this difference existed. Therefore, a posteriori tests were utilized to compare the three groups. Of the several methods available, Scheffé's test was chosen to reveal specific significantly different means, since it is recognized as being the most conservative, that is, yielding the smallest number of significant differences.<sup>4</sup> The results of the Scheffé tests revealed no significant difference between Group I and Group II, no significant difference between Groups I and III, but a significant difference ( $P \leq .05$ ) between Group II and Group III.

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<sup>4</sup>Winer, Statistical Principles in Experimental Design.

Group III, the group using instructional aids, yielded significantly higher scores than Group II, the group using instructional devices.

Graphic illustrations of the means for the pre-treatment and posttreatment scores for each group for each test are depicted in Figures 1, 2, 3, and 4. These graphs revealed that there were mean score improvements by each group on each skill from the pretreatment period to the posttreatment period. In order to determine if these mean gains were significant, t tests were run on each skill for each group. The t tests for improvement on the four skills for Groups I, II, and III are shown in Tables 11, 12, and 13, respectively. These tables show that significant improvement occurred in the skills of general volleyball ability, spiking, passing, and setting during a six week instructional period regardless of the instructional approach (treatment) utilized. The average performance of the four skills was improved with treatment, whether this treatment was traditional, traditional supplemented with instructional devices, or traditional supplemented with instructional aids.

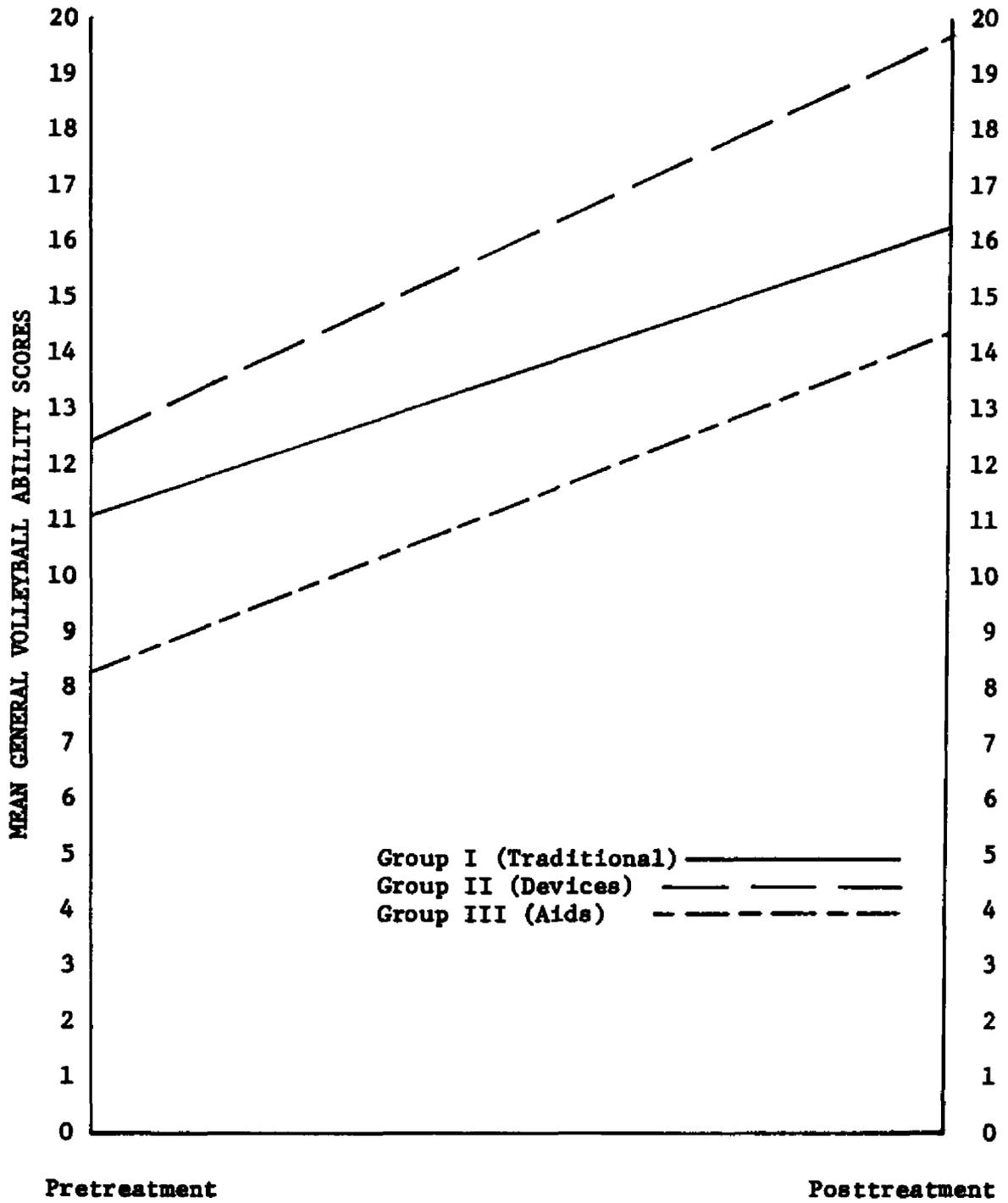


Figure 1

Comparison of Mean Scores on Pretreatment and Posttreatment  
General Volleyball Ability Skill Tests for  
Groups I, II, and III

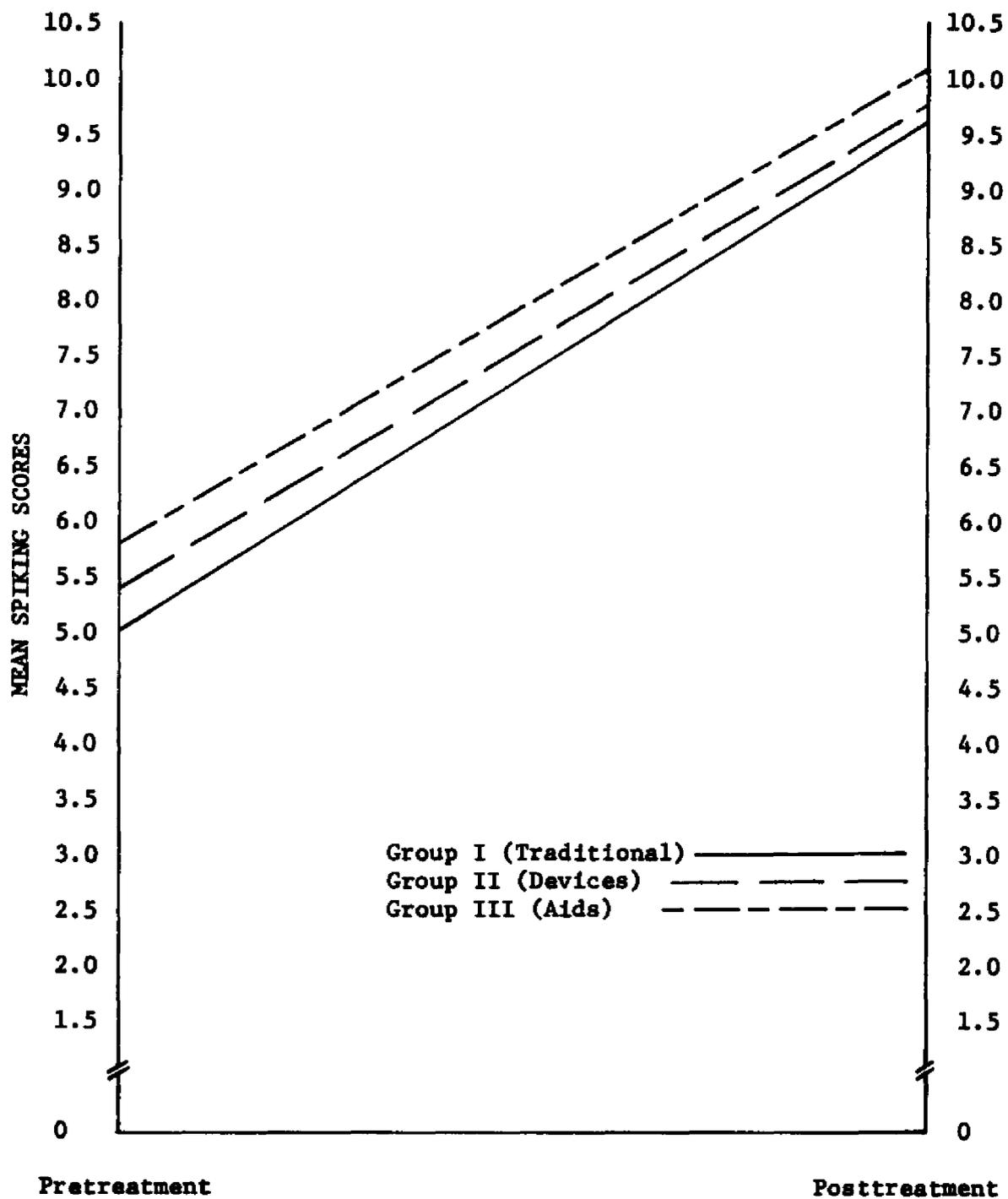


Figure 2

Comparison of Mean Scores on Pretreatment and Posttreatment Spiking Skill Tests for Groups I, II, and III

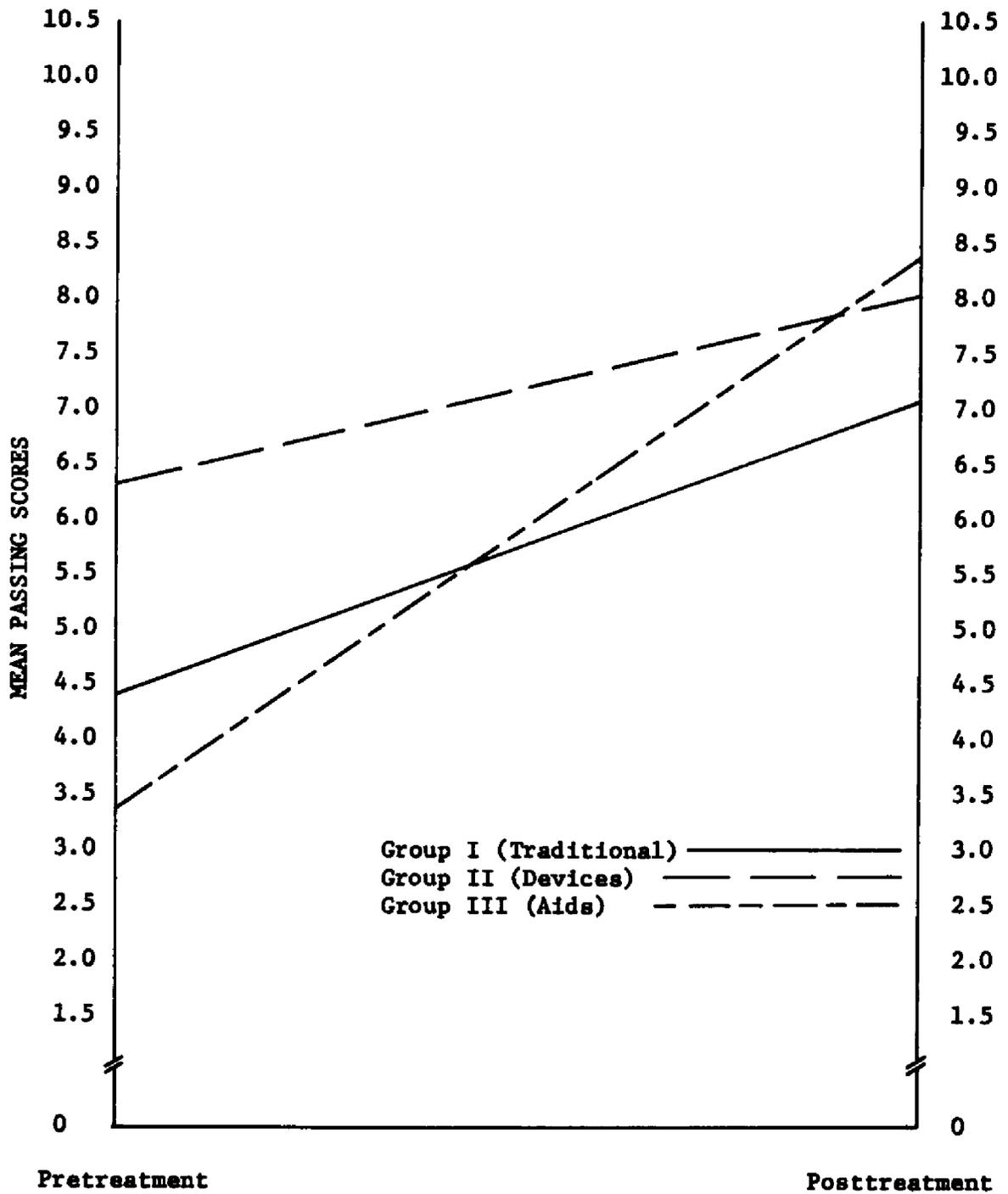


Figure 3

Comparison of Mean Scores on Pretreatment and Posttreatment  
Passing Skill Tests for  
Groups I, II, and III

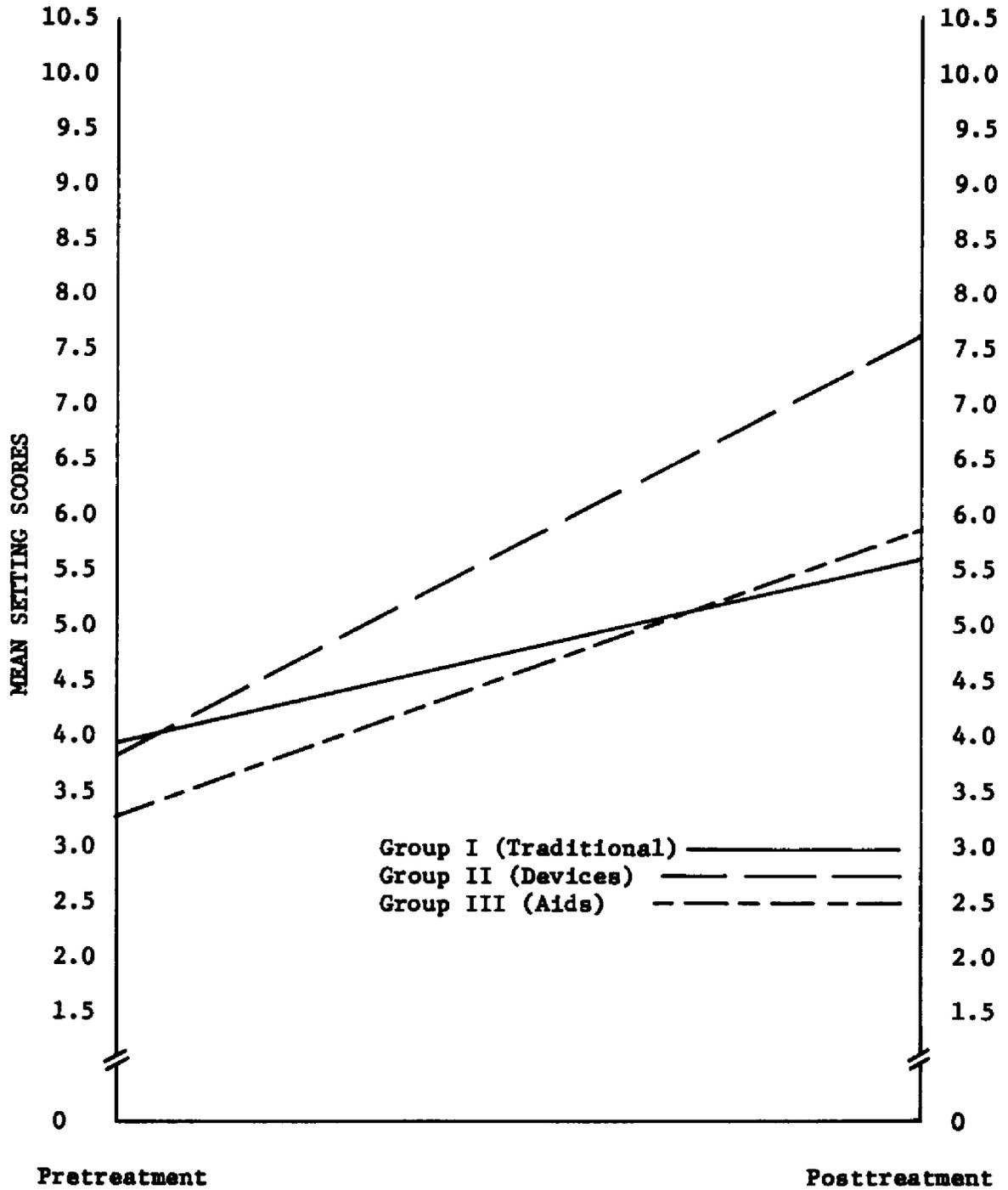


Figure 4

Comparison of Mean Scores on Pretreatment and Posttreatment  
Setting Skill Tests for  
Groups I, II, and III

Table 11

t Values for Improvement in Four Volleyball Skills  
for Group I (Traditional)

Skills	Sum of D	Sum <sub>2</sub> of D <sup>2</sup>	<u>t</u>
General Volleyball Ability	81	749	4.260
Spiking	75	597	4.640
Passing	43	331	2.828
Setting	26	144	2.490

t for P of .05 = 2.131

N = 16

Table 12

t Values for Improvement in Four Volleyball Skills  
for Group II (Instructional Devices)

Skills	Sum of D	Sum <sub>2</sub> of D <sup>2</sup>	<u>t</u>
General Volleyball Ability	148	1792	5.480
Spiking	88	868	3.928
Passing	35	301	2.204
Setting	75	475	5.252

t for P of .05 = 2.093

N = 20

Table 13

t Values for Improvement in Four Volleyball Skills  
for Group III (Instructional Aids)

Skills	Sum of D	Sum of D	<u>t</u>
General Volleyball Ability	81	863	4.275
Spiking	69	411	6.806
Passing	75	457	8.000
Setting	37	229	3.033

t for P of .05 = 2.145  
N = 15

#### DISCUSSION

Generally, within the scope of this study, it appears as if no particular instructional approach is more effective than another except in teaching the skill of passing. According to the results of this study, improvement in the ability of passing is greater when using loop films and video-taped performances of the subjects than when using volleyball goals. If one were to assume that practice increases psychomotor skills, then this result is surprising in view of the fact that the group whose instruction was supplemented with loop films and video-taped performances of the subjects did not have as much class time available for the purpose of practicing the skill of passing as did the group using volleyball goals. The time involved in viewing

the loop films and video-taped performances in addition to the time required to tape each subject's performance consumed no fewer than ten minutes per class meeting and in some cases as much as fifteen minutes.

An interesting observation is the relationship between the skill test in passing and the utilization of the volleyball goals; both height and accuracy were required for successful completion of each task. The volleyball goals were suspended from the tops of basketball backboards with the tops of the goals approximately twelve feet from the floor with an area of two feet by two and one-half feet. In the passing skill test the ball had to be passed over a rope ten feet high and onto a floor target area four feet by six feet. Prior to analysis of the data, one might have assumed that the similarity between these two activities would have shown an obvious advantage for the group utilizing the volleyball goals on the posttest in the skill of passing.

When reviewing the results of this study, many questions were raised which can not be answered by the investigator; only possible reasons can be proffered. Why did not a particular instructional approach seem to matter except in the skill of passing and why was the use of loop films and video-taped performances more effective than the use of volleyball goals for the acquisition and improvement of the skill of passing? Although it was not the purpose of

this study to find out why one approach may or may not be more effective than another, these questions come to mind because the outcome may have been caused in part by such factors as the numbers in the experimental groups (Group II had twenty subjects, and Group III had fifteen subjects), the enthusiasm of the instructor, class interest, lack of or greater motivation on the part of subjects and instructor, and differences in effort among the groups while performing the skills tests. While a given factor such as class size may be controlled in future studies, did this factor really affect the outcome? While it is true that the class with fifteen subjects did perform significantly better on the skill of passing than did the group with twenty subjects, why did this not hold true for the other skills? The same questions apply to such things as motivation, class interest, instructor enthusiasm, and other factors previously mentioned.

Since very little research has been conducted relative to the acquisition and improvement of fundamental volleyball skills, more specifically, relative to the use of instructional aids and devices in teaching volleyball skills, it is difficult to support or to disagree with findings relative to the effectiveness of these tools in teaching the fundamental skills of volleyball. In the review of the literature the three studies cited relative to the teaching of volleyball skills revealed no significant

differences in favor of the use of instructional aids and devices; however the results of this study indicated that the use of loop films and video-taped performances of the subjects resulted in greater gains in mean passing skill performance than when using volleyball goals, but not greater gains than when using the traditional approach.

## Chapter 5

### SUMMARY, FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

The purpose of this study was to ascertain the effects of supplementing traditional instruction with selected instructional aids and devices on the improvement of fundamental volleyball skills at the college level. The instructional aids used in this study were loop film models of performance and video-taped performances of the subjects. The instructional devices used in this study were the Spike-It, volleyball goals, and harnessed ball devices. The criterion variable was the ability to pass, set, and spike as measured by the AAHPER Passing Test, the AAHPER Set-Up Test, and the Sandefur Spiking Test.

#### SUMMARY

The subjects used in this study were fifty-one (51) male and female students enrolled in three volleyball service classes at Pembroke State University during the second half of the Fall Semester of the 1977-78 academic year. Class section one (01) met on Mondays and Wednesdays at 12:00 noon and was randomly designated as Group I. This

group was randomly assigned to traditional instruction. Section two (02) met on Mondays and Wednesdays at 1:00 p.m. and was randomly designated as Group II. This group was randomly assigned to traditional instruction supplemented with instructional devices including volleyball goals, harnessed ball devices, and the Spike-It. Class section three (03) met on Tuesdays and Thursdays at 12:30 p.m. and was randomly designated as Group III. This group was randomly assigned to traditional instruction supplemented with instructional aids including loop films and video-taped performances of the subjects.

Group I (Traditional), Group II (Instructional Devices), and Group III (Instructional Aids) consisted of sixteen, twenty, and fifteen subjects, respectively. Classes met for fifty minutes, twice a week, for six weeks. All classes were conducted in the Auxiliary Gymnasium located in the Health and Physical Education Center and were taught by the investigator.

During the first class meeting, each subject completed a background data form to gather information to be used by the investigator at a later date in an attempt to determine whether sex, previous experiences in other physical education activity classes, or participation in varsity or intramural programs affected improvement in fundamental volleyball skills. During the second, third, and fourth class meetings, pretests on general volleyball

ability, spiking, passing, and setting were administered to each group. Posttests were administered during the tenth, eleventh, and twelfth class meetings. All testing was conducted under the same conditions for all the subjects.

Group I received traditional instruction consisting of explanations, demonstrations, drills, practice, and lead-up games. None of the selected aids or devices were used by this group.

The subjects in Group II and Group III were randomly assigned to four subgroups each prior to the first class meeting. Each subgroup in Group II consisted of five subjects each. Subgroups in Group III consisted of three or four subjects each. Students using instructional devices (Group II) utilized volleyball goals for practicing the skills of setting and passing. Each subgroup was assigned to a volleyball goal station. Harnessed ball devices and the Spike-It were used to practice the skill of spiking. The subgroups rotated at seven-minute intervals so that all subjects had equal time on the Spike-It. The Spike-It and harnessed ball devices served the same function of holding a ball stationary at various levels.

Subjects in the group utilizing instructional aids (Group III) observed loop films and were video taped each class meeting beginning with the fifth meeting and continuing through the ninth meeting. At the beginning of each class meeting, the entire class observed a loop film or

films appropriate to the skills introduced or reviewed in the daily lesson plan. After viewing the film or films and practicing a given skill, each subject's performance was video taped and replayed with instructor feedback.

Immediately following the reply, the subject viewed the appropriate loop film. Each subject was taped twice during each class meeting and viewed the loop film twice as a member of a subgroup in addition to viewing the loop film as a member of the class at the beginning of each class meeting.

The analysis of variance statistical technique was used to determine if any real difference existed among the groups in regard to improving in the performance of selected volleyball skills as the result of the instructional approach (treatment) utilized.

#### FINDINGS

The findings of this study revealed the following:

1. There were no significant differences in general volleyball ability among the three groups based on the initial test data.

2. There were no significant differences among the experimental treatments for increasing mean skill performance of general volleyball ability.

3. There were no significant differences among the groups in mean spiking skill performance as a result of the experimental treatments.

4. There was a significant difference in mean passing skill performance as a result of the experimental treatments. A significant difference was revealed between Group II and Group III. The group utilizing loop films and video-taped performances (Group III) made greater gains in mean passing skill performance than the group utilizing volleyball goals (Group II).

5. There were no significant differences among the groups in mean setting skill performance as a result of the experimental treatments.

6. There was significant improvement within the three groups on the skills of general volleyball ability, spiking, setting, and passing during the experimental period.

### CONCLUSIONS

The overall findings indicate that no particular instructional approach (treatment) used in this study is more effective than another in teaching the fundamental skills of volleyball except in the skill of passing. Improvement in passing ability is significantly greater when using loop films and video-taped performances of the subjects than when using volleyball goals when teaching the skill of passing, but is not significantly greater than when

using the traditional approach. Regardless of the instructional approach (traditional, traditional supplemented with instructional devices, or traditional supplemented with instructional aids) used in this study, significant improvement occurred in each of the three groups in all four skills.

### RECOMMENDATIONS

The recommendations listed below are based on the findings and limitations of this study.

1. A similar study should be conducted over a period of time greater than six weeks.

2. The skill of passing should be investigated further regarding the use of instructional aids and devices.

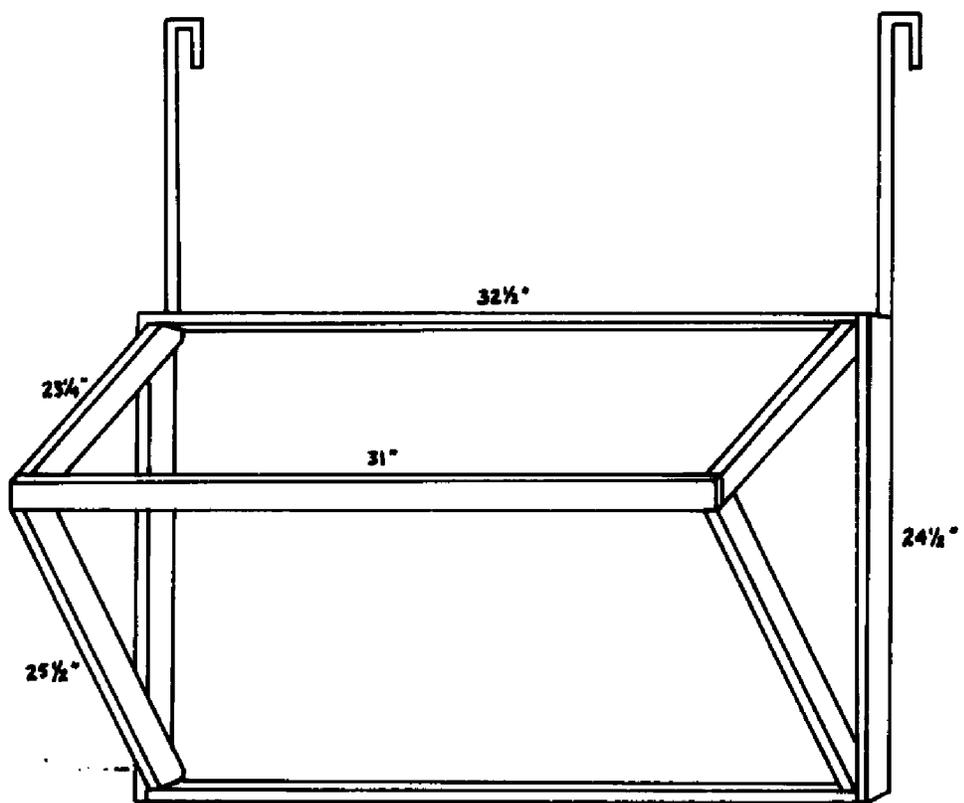
3. An analogous study should be made utilizing high school students to determine whether one instructional approach is more effective than another on the secondary level.

4. A study should be conducted to ascertain whether a student improves more in the fundamental skills of volleyball in a coeducational or non-coeducational setting.

5. A similar study should be conducted using a greater number of subjects.

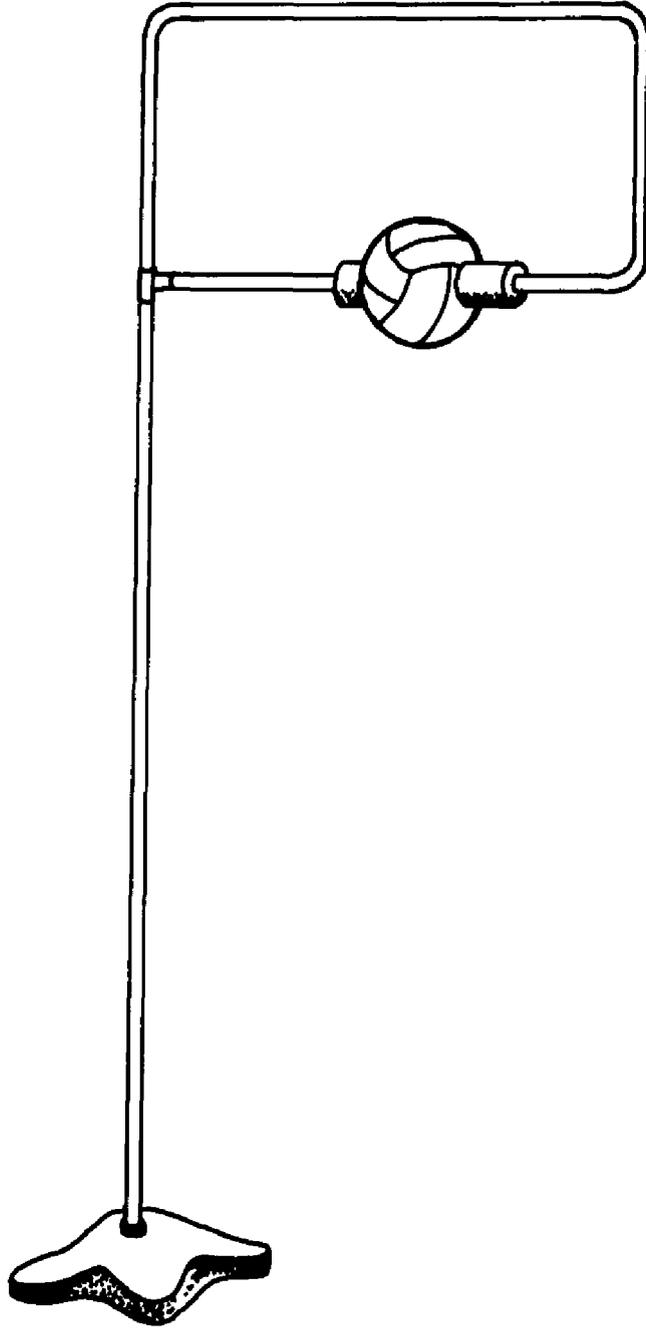
## **APPENDIXES**

**APPENDIX A**  
**VOLLEYBALL GOAL**

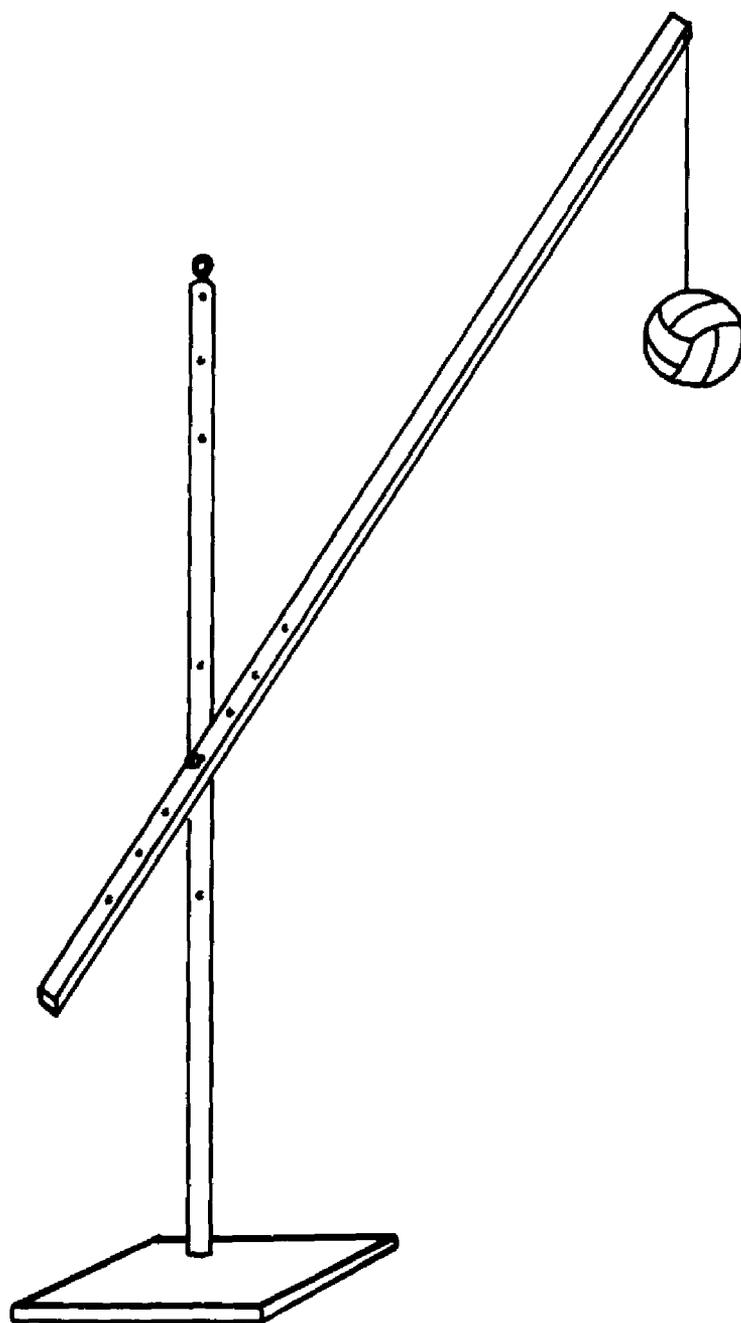


**APPENDIX B**

**SPIKE-IT**



**APPENDIX C**  
**HARNESSED BALL DEVICE**



**APPENDIX D**

**BACKGROUND DATA FORM**



IV. INTRAMURAL AND RECREATION EXPERIENCE:

Please list, under the appropriate headings, the name of the sport and the number of years of participation.

	<u>SPORT</u>	<u>HIGH SCHOOL</u>	<u>COLLEGE</u>	<u>RECREATION</u>
1.				
2.				
3.				
4.				
5.				
6.				

V. PREVIOUS VOLLEYBALL INSTRUCTION:

	<u>PLACE</u>	<u>NUMBER OF WEEKS</u>
1.	___ High School	1.
2.	___ College	2.
3.	___ Recreation	3.
4.	___ Camp	4.
5.	___ Clinic	5.

APPENDIX E

LOOP FILMS

<u>Stock Number</u>	<u>Title</u>	<u>Time</u>
IV-2	Roundhouse Floating Serve--The Forearm Pass	(3.52)
IV-3	The Set-Back Set	(3.52)
IV-4	The Spike	(3.48)

These 8mm silent loop films are produced in color and are presented in normal and slow motion. Captions are superimposed on each loop to identify key techniques.

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Source: Athletic and Physical Education Curriculum Planning Guide (North Palm Beach, Florida: The Athletic Institute, 200 Castlewood Drive, 1977), p. 17.

**APPENDIX F**

**TEST DESCRIPTIONS AND DIAGRAMS**

## High Wall Volley Test

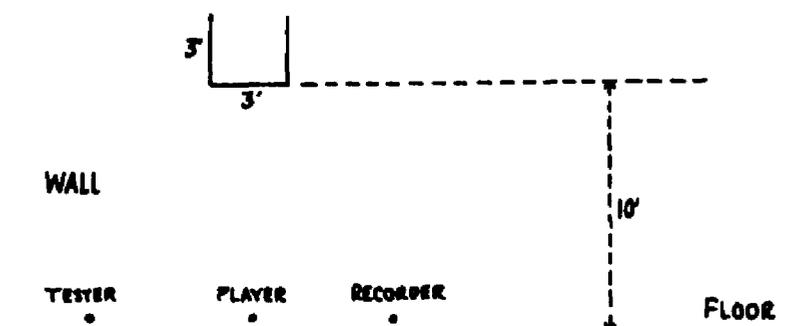
Purpose: To measure volleyball playing ability.

Equipment: Volleyballs (preferably leather), masking tape or chalk to mark the target areas, stopwatch, score cards, and pencils.

Procedure: The test consists of two 30-second trials. The player stands anywhere in front of the target (there is no restraining line). With the signal "ready, go" the player uses any type of toss or hit to send the ball into the target area on or above the 10-foot line and on or between the two vertical lines extended. When the ball returns, the player volleys it repeatedly into the target area. Only one contact is allowed on each volley. If a player loses control of the ball, it must be recovered by the player who starts again as before. A subject may not use the sequence "toss, volley, catch; toss, volley, catch" but must make an attempt to perform a repeated volley. Following the first trial the player rests while the other members of the group (six to eight players) take their first trial. A second trial is given as before.

Scoring: One point is scored each time the ball hits in the target area or on the lines bounding it (including imaginary extensions of the vertical lines), following a legal volley of a ball rebounding from the wall. The toss or hit to start the ball does not count. If the player loses control of the ball, scoring continues with the next legal hit.

Testing Area: A flat, unobstructed wall space nine feet wide and fifteen feet high is needed for each test area. The target area is formed by a 3-foot horizontal line placed ten feet from the floor with 3-foot vertical lines extending upward at right angles to the horizontal line.



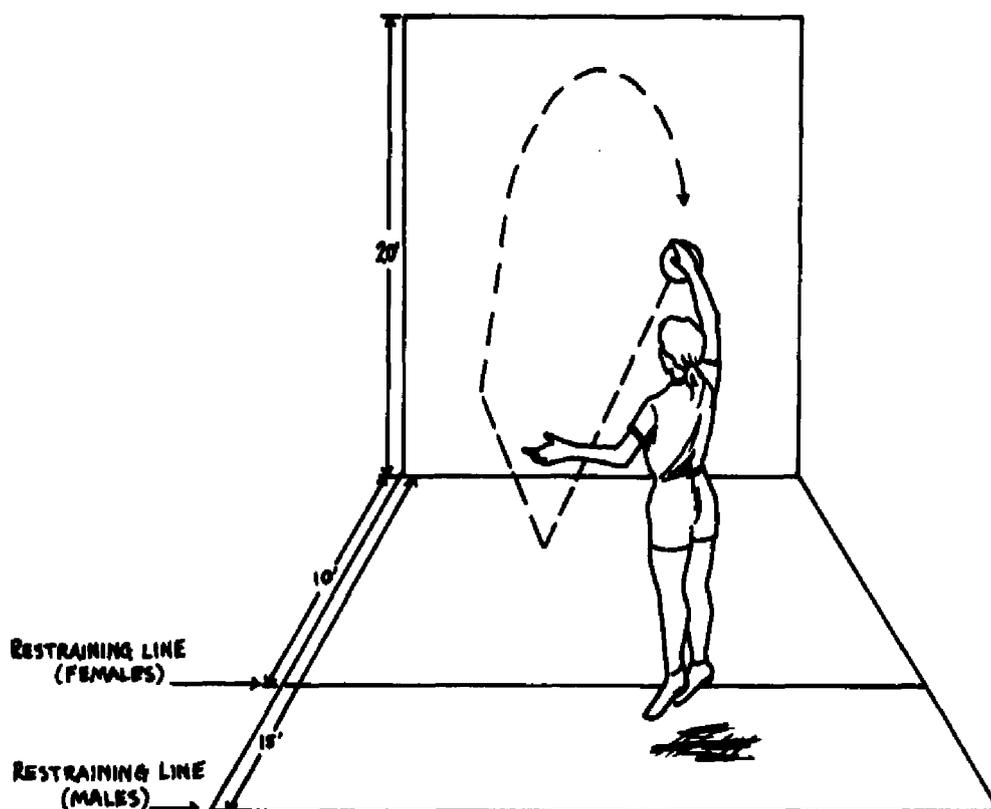
### Sandefur Spiking Test

**Purpose:** To measure a player's ability to execute a timed coordinated jump in conjunction with a controlled spiked ball.

**Equipment:** Volleyballs, masking tape or chalk for marking restraining lines, stopwatch, score cards, and pencils.

**Procedure:** The subject tosses the ball above and in front of his head and then jumps and spikes the ball downward toward the floor at such an angle that it rebounds, strikes the front wall and returns at least chest high behind the restraining line. The subject must be in the air when he strikes the ball and it must be at least chest high when he strikes it. The subject attempts to repeatedly spike the ball in this fashion for one minute. The time starts when the subject tosses the ball up to spike it and does not stop for line violations or illegally hit spikes.

**Scoring:** One point is awarded for each legally spiked ball. Total score is the number of points accumulated in one minute.



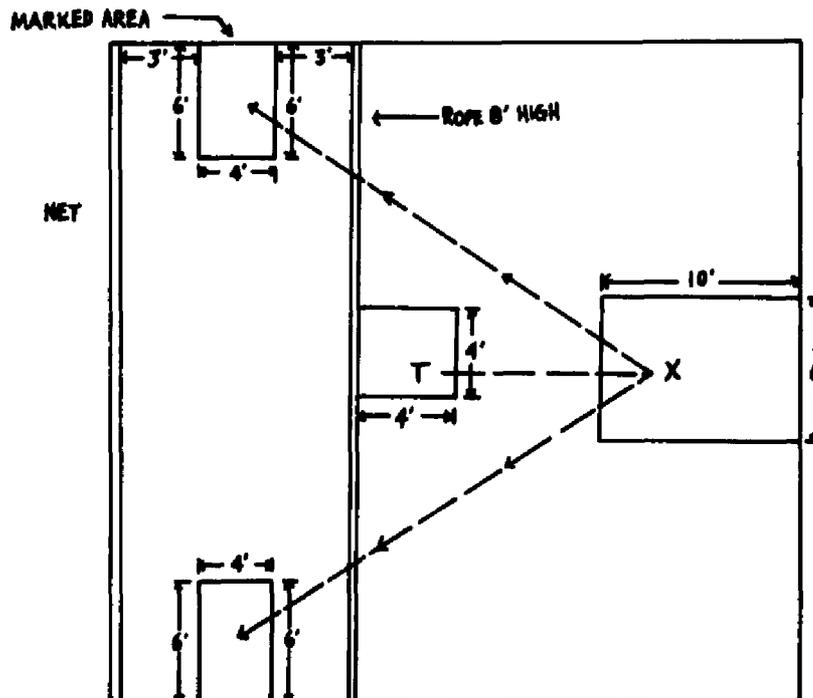
### AAHPER Passing Test

**Purpose:** To measure the player's skill in passing a volleyball from the rear of the court toward the net.

**Equipment:** Volleyballs, volleyball net and standards, 4-foot by 6-foot mats or marked areas on floor, 30-foot rope and two standards eight feet high, masking tape or chalk to mark areas on the floor, score cards, and pencils.

**Procedure:** Passer X (person being tested) stands in the center back position of the court, receives a high throw (similar to a two-hand basketball shot) from thrower T, and executes a pass so that it goes over the rope and onto the mat or marked areas. The passer is given twenty trials performed alternately to the right and to the left. The trial counts but no points are recorded if the ball touches the rope or net or does not fall onto the target areas. Throws from T that do not fall into the 6-foot by 10-foot area are to be repeated.

**Scoring:** One point is scored for each pass going over the rope and landing on or hitting any part of the target areas (including lines) with 20 the maximum.



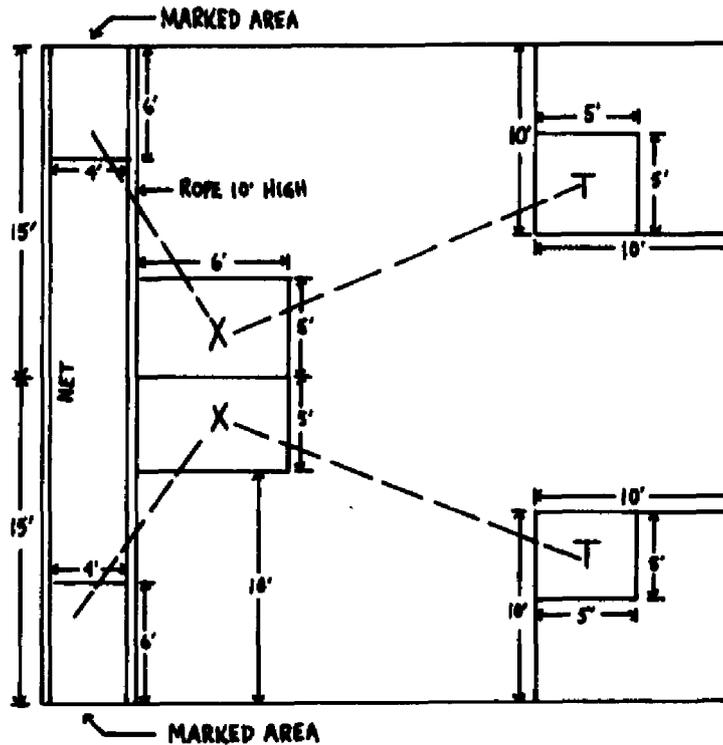
AAHPER Set-Up Test

Purpose: To measure the player's ability to set-up the volleyball toward the net.

Equipment: Volleyballs, volleyball net and standards, 4-foot by 6-foot mats or marked areas on floor, 30-foot rope and two standards ten feet high, masking tape or chalk for marking floor areas, score cards, and pencils.

Procedure: Set-up man X (person being tested) stands in midcourt position within the 6-foot by 5-foot area shown in the diagram below. He receives a high throw (similar to a two-hand basketball shot) from thrower T, and executes a set-up so that it goes over the rope and onto the target areas. Throws from T that do not fall into the 6-foot by 5-foot area are to be repeated. The set-up man has ten trials to the right and ten to the left. The trial counts but no points are recorded if the ball touches the rope or net or does not fall on the target areas.

Scoring: One point is scored for each set-up that goes over the rope and lands on or hits any part of the target area (including lines) with 20 maximum.



**APPENDIX G**

**RAW DATA**

**Pretreatment and Posttreatment Test Scores  
for Group I (Traditional)**

Subjects	Selected Volleyball Skills							
	GVA		Spiking		Passing		Setting	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
1	4	6	0	6	0	4	1	3
2	3	7	1	4	3	3	3	9
3	9	23	1	3	5	4	3	4
4	18	25	4	6	8	11	2	3
5	6	15	6	8	7	7	2	3
6	25	24	5	8	4	8	7	3
7	11	16	3	13	8	2	3	8
8	3	6	1	6	1	1	2	6
9	15	23	6	14	7	5	7	5
10	15	17	15	18	7	11	5	6
11	18	24	13	18	10	18	9	14
12	8	19	8	12	1	7	2	4
13	6	12	0	7	0	6	4	5
14	28	23	4	17	8	14	9	9
15	9	18	8	15	2	7	4	7
16	0	1	5	0	0	6	1	1

**Pretreatment and Posttreatment Test Scores  
for Group II (Instructional Devices)**

Subjects	Selected Volleyball Skills							
	GVA		Spiking		Passing		Setting	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
1	9	19	2	9	5	3	4	9
2	7	16	0	4	2	4	6	5
3	26	23	12	12	10	7	6	9
4	4	9	0	0	1	4	2	1
5	23	16	5	10	9	10	4	10
6	16	22	16	20	9	10	6	10
7	16	18	7	19	5	12	8	13
8	16	27	3	16	11	11	4	12
9	10	30	0	12	4	15	4	9
10	15	22	12	17	8	8	1	9
11	6	23	2	3	8	10	4	6
12	7	17	6	7	5	4	4	7
13	10	23	9	22	9	11	5	9
14	2	10	0	4	8	12	4	5
15	22	29	5	4	5	1	4	8
16	13	20	11	6	6	10	4	6
17	0	2	0	1	2	0	1	0
18	10	19	2	6	7	8	4	5
19	18	25	12	13	5	10	2	0
20	18	26	4	11	7	11	1	12

**Pretreatment and Posttreatment Test Scores  
for Group III (Instructional Aids)**

Subjects	Selected Volleyball Skills							
	GVA		Spiking		Passing		Setting	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
1	6	12	2	7	2	4	2	6
2	5	12	5	6	0	5	8	2
3	18	27	2	8	6	14	7	10
4	23	21	18	19	5	13	5	5
5	4	4	4	7	6	7	3	7
6	1	5	0	4	0	2	0	7
7	6	23	9	15	2	11	4	6
8	2	7	1	8	2	6	0	3
9	9	13	4	14	6	12	5	5
10	9	14	9	11	5	12	4	6
11	13	28	7	11	5	8	3	5
12	1	4	1	4	2	6	0	4
13	12	18	11	17	4	10	2	9
14	7	13	4	12	4	8	2	6
15	9	15	6	8	2	8	4	5

**BIBLIOGRAPHY**

## BIBLIOGRAPHY

### A. BOOKS

- Athletic and Physical Education Curriculum Planning Guide. North Palm Beach, Florida: The Athletic Institute, 200 Castlewood Drive, 1977.
- Dowell, Linus J. Strategies for Teaching Physical Education. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1975.
- Eckert, Helen M. Practical Measurement of Physical Performance. Philadelphia: Lea & Febiger, 1974.
- Edwards, A. L. Experimental Design in Psychological Research. New York: Holt, Rinehart and Winston, 1960.
- Emery, Curtis Ray. Modern Volleyball. New York: The Macmillan Company, 1953.
- Gregory, Kathleen, and Bobbi Parrish. "Fundamental Volleyball," Coaches Digest. Branford, Connecticut: Publishing, Inc., 126 Pawson Road, 1976.
- Haskins, Mary Jane. Evaluation in Physical Education. Dubuque, Iowa: Wm. C. Brown Company, 1971.
- Johnson, Barry L., and Jack K. Nelson. Practical Measurements for Evaluation in Physical Education. Minneapolis, Minnesota: Burgess Publishing Company, 1974.
- Laveaga, Robert E. Volleyball. New York: The Ronald Press Company, 1960.
- Neilson, N. P., and Clayne R. Jensen. Measurement and Statistics in Physical Education. Belmont, California: Wadsworth Publishing Company, Inc., 1972.
- Sandefur, Randy. Volleyball. Pacific Palisades, California: Goodyear Publishing Company, Inc., 1970.

- Siedentop, Daryl. Developing Teaching Skills in Physical Education. Boston: Houghton Mifflin Company, 1976.
- Trotter, Betty Jane. Volleyball for Girls and Women. New York: The Ronald Press Company, 1965.
- Winer, B. J. Statistical Principles in Experimental Design. New York: McGraw-Hill Book Company, 1962.

#### B. PERIODICALS

- Baley, James A. "Teaching the Spike in Volleyball," Journal of Health, Physical Education, and Recreation, 35:57-58, November-December, 1964.
- Brown, Howard Steven, and Lloyd Messersmith. "An Experiment in Teaching Tumbling With and Without Motion Pictures," Research Quarterly, 19:304-307, July, 1948.
- Chui, Edward F. "A Study of Golf-O-Tron Utilization as a Teaching Aid in Relation to Improvement and Transfer," Research Quarterly, 36:147-152, May, 1965.
- Cunningham, Phyllis, and Joan Garrison. "High Wall Volley Test for Women's Volleyball," Research Quarterly, 39:486-490.
- Dailey, Lucille, Janet Wessel, and Richard C. Nelson. "Effectiveness of a Bowling Aid to University Bowling Instruction," Research Quarterly, 34:136-143, May, 1963.
- Gray, Charles A., and Wayne B. Brumbach. "Effect of Daylight Projection of Film Loops on Learning Badminton," Research Quarterly, 38:562-569, December, 1967.
- Kaye, Richard A. "The Use of a Waist-Type Flotation Device as an Adjunct in Teaching Beginning Swimming Skills," Research Quarterly, 36:277-281, October, 1965.
- Lindeburg, Franklin A., and Jack E. Hewitt. "Effect of an Oversized Basketball on Shooting Ability and Ball Handling," Research Quarterly, 36:164-167, May, 1965.
- Lockhart, Aileene. "The Value of the Motion Picture as an Instructional Device in Learning a Motor Skill," Research Quarterly, 15:181-187, May, 1944.

- Mathews, Donald K., and Joe McDaniel. "Effectiveness of Using Golf-Lite in Learning the Golf Swing," Research Quarterly, 33:486-491, October, 1962.
- McCatty, Cressy A. M. "Effects on the Use of a Flotation Device in Teaching Nonswimmers," Research Quarterly 39:621-626, October, 1968.
- Nelson, Dale O. "Effect of Slow-Motion Loopfilms on the Learning of Golf," Research Quarterly, 29:37-45, March, 1958.
- Penman, Kenneth A., Douglas Bartz, and Rex Davis. "Relative Effectiveness of an Instant Replay Videotape Recorder in Teaching Trampoline," Research Quarterly, 39:1060-1062, December, 1968.
- Reynolds, Herbert J. "Volleyball Tests," Journal of Health and Physical Education, 1:42, March, 1930.
- Solley, William H., and Susan Borders. "Relative Effects of Two Methods of Teaching the Forehand Drive in Tennis," Research Quarterly, 36:120-122, March, 1965.
- Volleyball Magazine, Number 3, Summer, 1976.

#### C. UNPUBLISHED MATERIALS

- Adams, Alice. "A Study to Investigate the Effectiveness of Using a Lightweight Plastic Ball in Teaching the Over-head Volley in Volleyball." Unpublished Master's thesis, University of North Carolina at Greenboro, 1971.
- Britt, Bobbie G. "A Comparison of the Effect of Mechanical Teaching Aids on Hitting a Baseball." Unpublished Doctoral dissertation, Texas A & M University, College Station, 1974.
- Brown, Dulcie Patricia. "The Effects of Augmenting Instruction with an Improvised Teaching Aid for College Women in Learning Selected Badminton Skills." Unpublished Doctoral dissertation, Indiana University, Bloomington, 1969.
- Bruce, Patricia J. "Effects of Conscious Relaxation and a Flotation Device on Learning Beginning Swimming." Unpublished Doctoral dissertation, Indiana University, Bloomington, 1961.

- Buzbee, Betty R. "Two Methods of Practicing the Set-Up in Volleyball." Unpublished Master's thesis, Southern Illinois University, Carbondale, 1971.
- Camp, Barbara A. "The Effects of Viewing Loopfilms on Tennis Skills and Form." Unpublished Master's thesis, North Texas State University, Denton, 1969.
- Carmichael, George Allen. "Videotape Instant Replay as a Teaching Technique in Beginning Bowling Classes." Unpublished Master's thesis, Washington State University, Pullman, 1969.
- Cox, Gay Anne. "The Effectiveness of Instruction Using a Visual Electronic Unit in the Development of Beginning Bowling Skill of College Women." Unpublished Master's thesis, University of Washington, Seattle, 1963.
- Douglas, John G. "The Value and Limitations of Loop Movies in the Teaching of Wrestling at the University of Massachusetts." Unpublished Master's thesis, Springfield College, Springfield, Massachusetts, 1963.
- Dressen, Clyda June. "The Value of a Loop Film in Teaching the Crawl Stroke." Unpublished Master's thesis, University of Colorado, Boulder, 1961.
- Drury, Francis A. "An Evaluation of Visual Aids in the Teaching of Tumbling." Unpublished Doctoral dissertation, State University of Iowa, Iowa City, 1959.
- Fisk, Timothy B. "Development of Basketball Shooting Accuracy as Affected by Varying Goal Sizes." Unpublished Master's thesis, South Dakota State University, Brookings, 1967.
- Graves, Judith M. "The Effectiveness of the Instant Videotape Recorder in Teaching the Tennis Serve." Unpublished Master's thesis, Lamar University, Beaumont, Texas, 1973.
- Grechus, Marilyn L. "The Effects of Videotape Feedback on a Selected Skill in Gymnastics." Unpublished Master's thesis, Central Michigan University, Mt. Pleasant, 1972.
- Hart, Douglas W. "Effectiveness of the 'Stroke-Builder' as a Tennis Backhand Learning Aid." Unpublished Master's thesis, Ithaca College, Ithaca, New York, 1971.

- Hawthorne, Martha E. "A Study of the Effectiveness of the Slow Motion Picture in Teaching Golf." Unpublished Master's thesis, Louisiana State University, Baton Rouge, 1964.
- Henschen, Keith Page. "The Effects of a Small Basket Upon Basketball Shooting Accuracy with the Nondominant Hand." Unpublished Doctoral dissertation, Indiana University, Bloomington, 1971.
- Huselton, Richard Lee. "The Effectiveness of Using the Polaroid Camera in the Teaching of Archery." Unpublished Master's thesis, Washington State University, Pullman, 1962.
- Irwin, June. "The Effects of Selected Audio-Visual Aids on Teaching Beginning Tennis Skill and Knowledge to College Women." Unpublished Doctoral dissertation, Indiana University, Bloomington, 1958.
- Kissler, Adrian Anthony. "The Validity and Reliability of the Sandefur Volleyball Spiking Test." Unpublished Master's thesis, California State College at Long Beach, 1968.
- Layton, Terry Wayne. "The Effects of a Basketball Training Glove on Shooting Accuracy." Unpublished Master's thesis, Mankato State College, Mankato, Minnesota, 1971.
- Mansfield, John R. "The Effects of Using Videotape and Loop Films as Aids in Teaching the Breast Stroke Whip Kick." Unpublished Master's thesis, the Pennsylvania State University, University Park, 1972.
- Maynard, Jo Taft. "A Comparison of Two Methods of Teaching Fencing." Unpublished Master's thesis, Smith College, Northampton, Massachusetts, 1962.
- Moore, Ballard J. "Evaluation of a Pictorial Form of Instructional Aid in the Teaching of a Motor Skill." Unpublished Doctoral dissertation, Louisiana State University, Baton Rouge, 1970.
- Nyce, Lawrence G. "The Effect of a Light-Weight Bowling Ball Upon Various Stages of Learning Beginning Bowling." Unpublished Master's thesis, University of Maryland, College Park, 1969.

- Paulat, James Gustav. "The Effects of Augmented Videotaped Information Feedback and Loop Film Models Upon Learning of a Complex Motor Skill." Unpublished Doctoral dissertation, Stanford University, Stanford, California, 1969.
- Plese, Elliott R. "A Comparison of Videotape Replay with a Traditional Approach in the Teaching of Selected Gymnastics Skills." Unpublished Doctoral dissertation, Ohio State University, Columbus, 1967.
- Reid, Dianne A. "The Effects of the Use of the Videotape Recorder as an Aid in Teaching the Volleyball Serve." Unpublished Master's thesis, the Pennsylvania State University, University Park, 1970.
- Rohland, Dale Arthur. "Instructional Aids in Tennis." Unpublished Master's thesis, University of California, Los Angeles, 1960.
- Sevier, Vernon A. "A Comparative Study of Teaching Swimming Skills to Beginners." Unpublished Master's thesis, University of Maryland, College Park, 1969.
- Spencer, Patricia May. "Movies, Slides and Demonstrations as Aids in Teaching." Unpublished Master's thesis, University of Colorado, Boulder, 1961.
- Stephens, Mary Walters. "An Evaluation of Video-tape Replay in the Acquisition of Perceptual Motor Skills in Beginning Badminton Classes." Unpublished Master's thesis, the University of Texas at Austin, 1972.
- Sullivan, Valerie L. "Effectiveness of Using the Videotape Recorder in Improving Vaulting Skills." Unpublished Master's thesis, University of Washington, Seattle, 1972.
- Tesch, Karen L. "The Effect of Visual Aids and Conventional Instruction on the Learning of Four Selected Gymnastics Skills." Unpublished Master's thesis, University of Wisconsin--LaCrosse, 1971.
- Warr, Susan A. "The Effects of Three Teaching Methods on the Learning of Skills in Beginning Archery." Unpublished Master's thesis, Brigham Young University, Provo, Utah, 1974.
- Wills, Keith C. "Effects of Different Methods of Instruction and Practice on Skill Acquisition." Unpublished Doctoral dissertation, Texas A & M University, College Station, 1970.

Winslade, Donald Kenneth. "The Effect of 8mm Slow Motion Color Film on the Learning of Specific Motor Skills." Unpublished Master's thesis, University of British Columbia, Vancouver, 1963.

Witenstein, Ann C. "The Use of the Videotape Recorder as a Teaching Aid." Unpublished Master's thesis, University of Maryland, College Park, 1970.

Zimmeran, Patricia A. "The Effect of Selected Visual Aids on the Learning of Badminton Skills." Unpublished Doctoral dissertation, University of Iowa, Iowa City, 1970.